

APPENDIX III

Pilot Study Program, Great Lakes
Shoreland Damage Study. Appendix VII

Part 2.

GREAT LAKES SHORELINE DAMAGE SURVEY

MUSKEGON, MANISTEE, SCHOOLCRAFT, CHIPPEWA,
ALCONA, AND HURON COUNTIES, MICHIGAN

Prepared for

U.S. Army Corps of Engineers
North Central Division
Chicago, Illinois

Contract No. DACW23-75-C-0027

By

Coastal Zone Laboratory
The University of Michigan
Ann Arbor, Michigan



11/321p.

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November 1975

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20 ABSTRACT (Continue on reverse side if necessary and identify by block number) This is an appendix to the Summary Report of the Pilot Study Program, Great Lakes Shoreland Damage Study. It identifies erosion and flood damage in the six named counties caused by or directly related to the 1972-1974 high water period on the Great Lakes. Aerial photo mosaics of county shorelands, are also included.		

Main Report	Summary Report of the Pilot Study Program, Great Lakes Shoreland Damage Study.
Appendix I	Great Lakes Shoreline Damage Survey; St. Louis County, Minnesota
Appendix II	Great Lakes Shoreline Damage Survey; Brown, Douglas, and Racine Counties, Wisconsin
Appendix III <i>2 pts</i>	Great Lakes Shoreline Damage Survey; Muskegon, Manistee, Schoolcraft, Chippewa, Alcona, and Huron Counties, Michigan
Appendix IV	Contract for a Damage Survey of Oswego County, New York
Appendix V	Shoreline Damage Survey: An Appraisal with Recommendations
Appendix VI	Engineering - Economic Analysis of Shore Protection Systems: A Benefit/Cost Model
Appendix VII	Measurement of Coastal Bluff Recession from Aerial Photographs, Muskegon County, Michigan
Appendix VIII	Comparison of Field Data Collection to Data Collected Using Study Instruments in Muskegon and Manistee Counties, Michigan

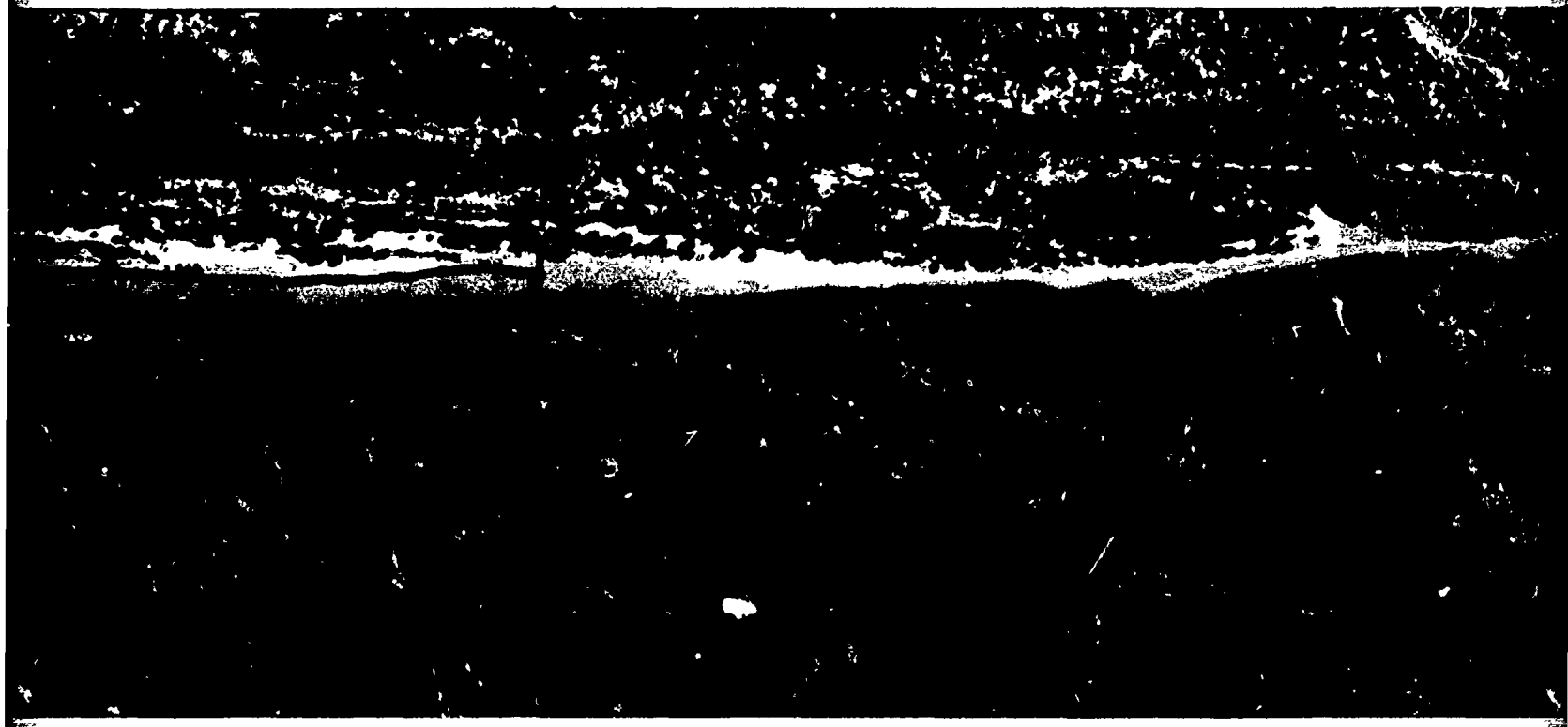


CHIPPEWA COUNTY, MICHIGAN REACH #1

Variable	No. of Responses	Mean	Standard Error of Mean	Range		Adjusted Expanded Total for All Property Listings
				Minimum	Maximum	
Assessed Value (\$)	2	2750	1750	1000	4500	
Reported Market Value (\$)	2	12000	2000	10000	14000	
Bluff Height (Ft.)	0					
Beach Depth (Ft.)	0					
Bluff Lost (Ft.)	0					
Beach Lost (Ft.)	0					
Damages Erosion (\$)	1	5000		5000	5000	
Damages Flooding (\$)	0					
Damages - Erosion and Flooding (\$)						22,500
Protective Structure Cost (\$)	0					0
Total Damages (\$)	1	5000		5000	5000	22,500

Total Identified Residential Properties: 9 Self-Administered Assessment Respondents: 2

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CHIPPEWA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 1
SCALE: 1" = 500'
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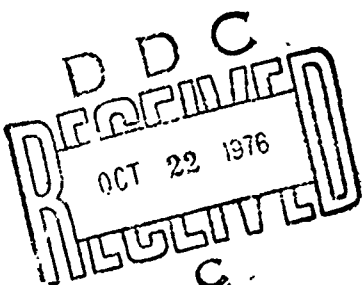
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PLATE NO. 1

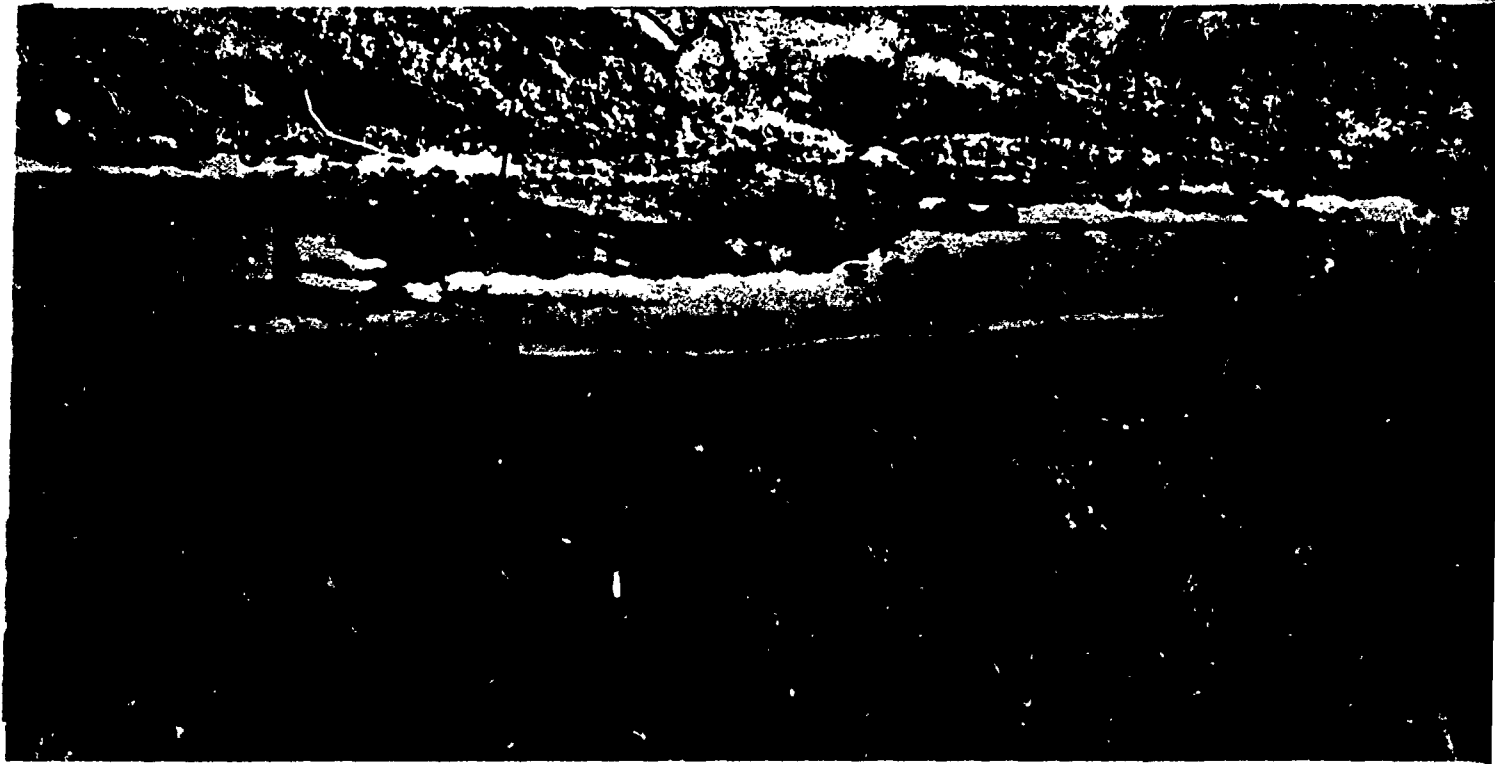
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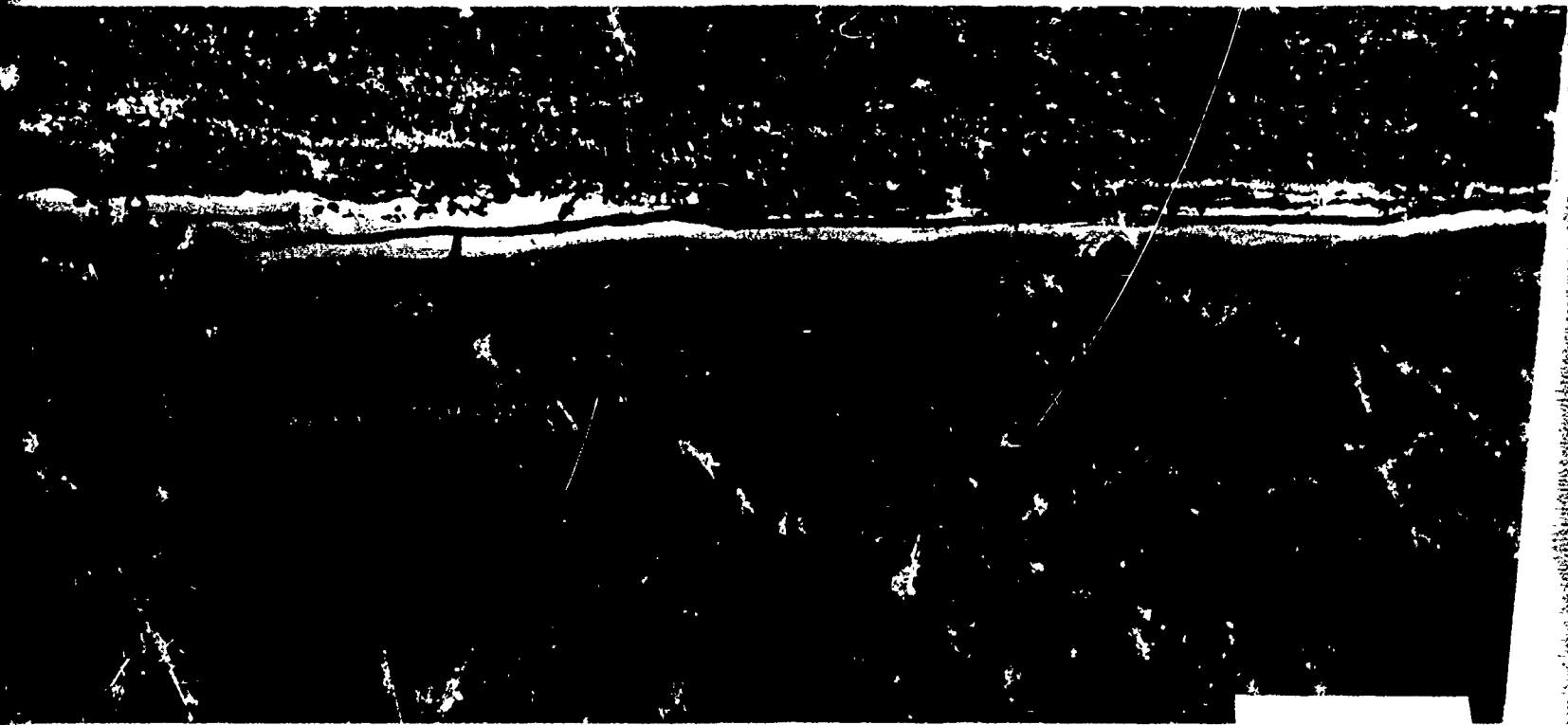
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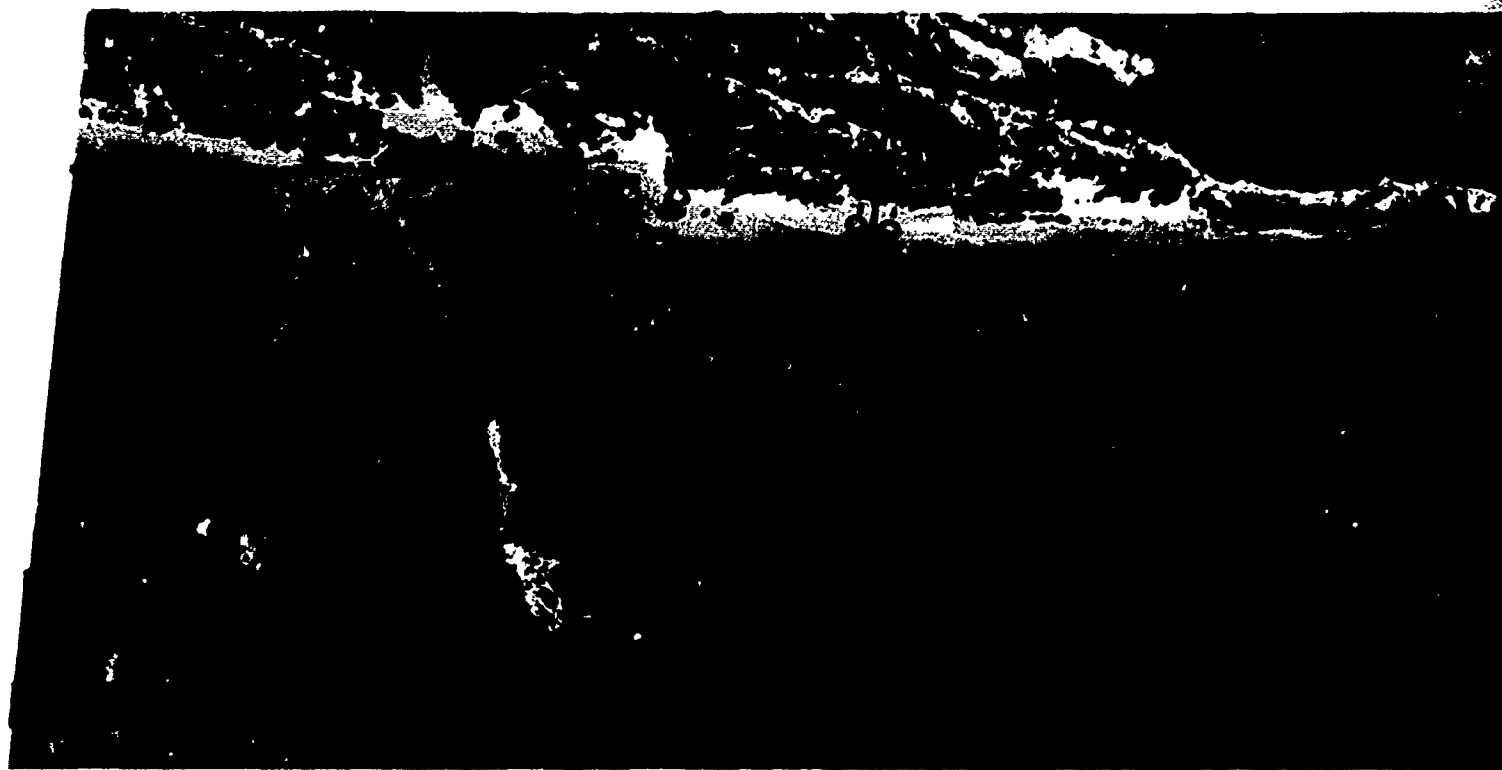


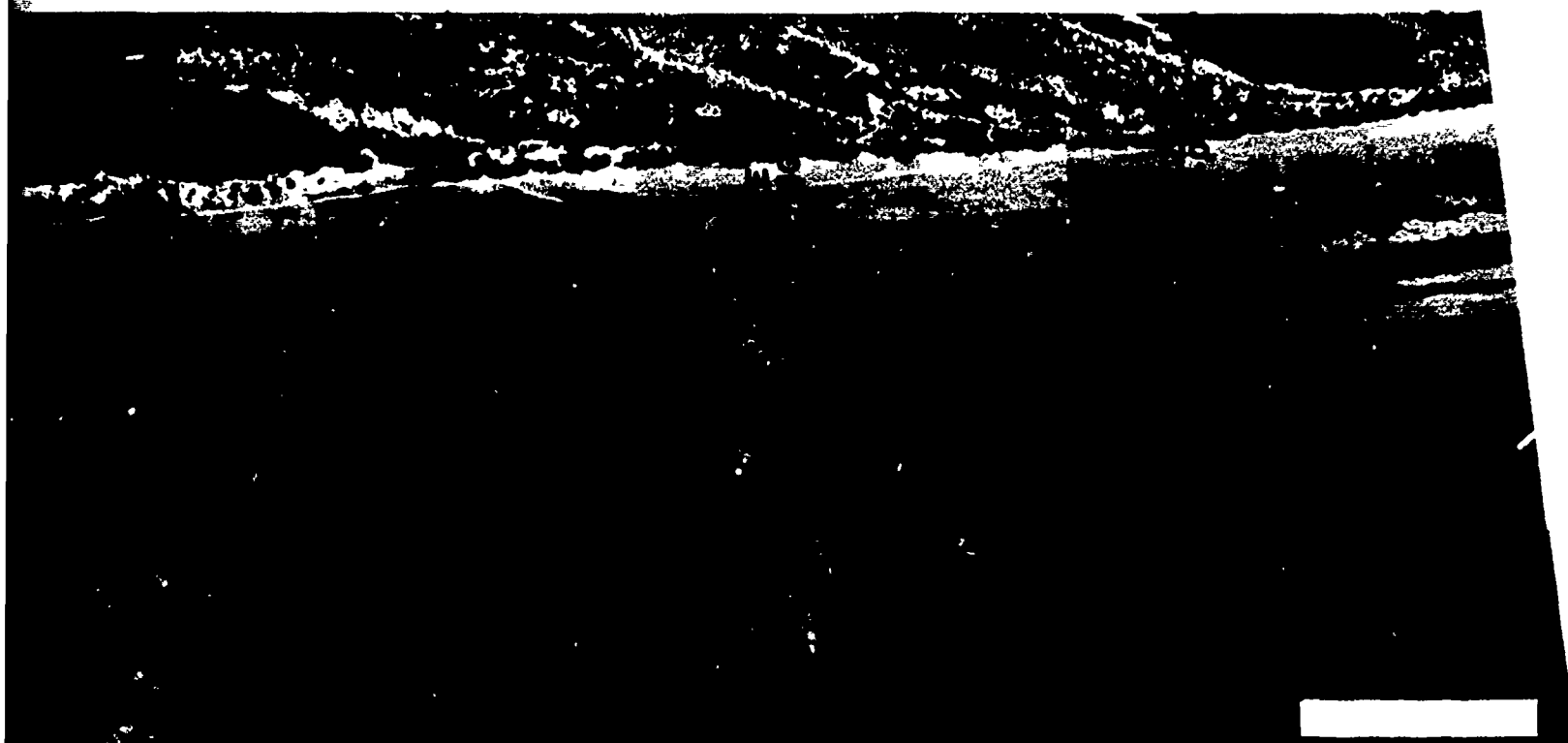
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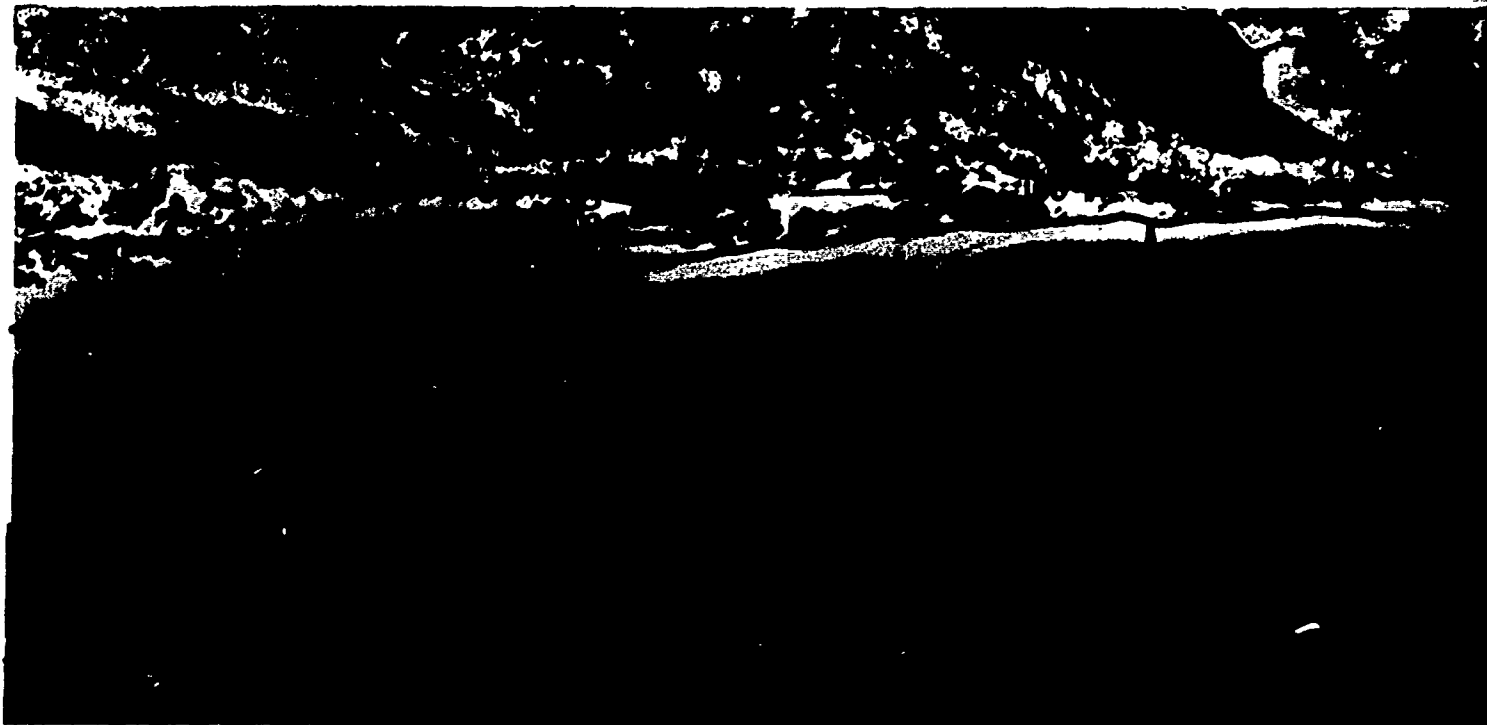


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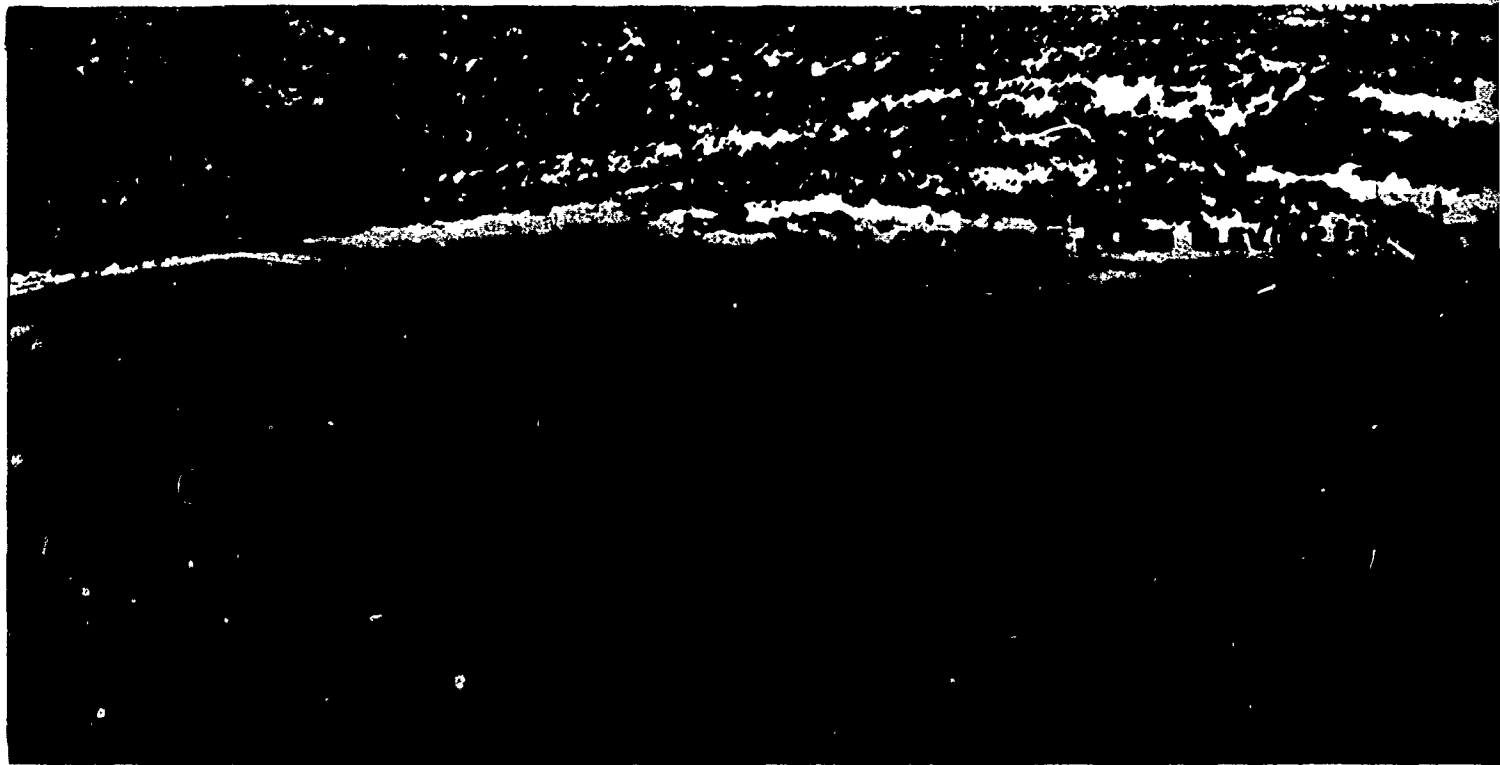
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Variable	No. of Responses	Mean	Standard Error of Mean	Range		As Pro
				Minimum	Maximum	
Assessed Value (\$)	9	4800	1100	1000	10000	
Reported Market Value (\$)	4	78500	40400	1000	168000	
Bluff Height (Ft.)	2	16	3	13	19	
Beach Depth (Ft.)	3	41	23	12	87	
Bluff Lost (Ft.)	3	13	11	1	35	
Beach Lost (Ft.)	3	15	10	1	35	
Damages Erosion (\$)	2	9200	9050	150	18200	
Damages Flooding (\$)	1	500		500	500	
Damages - Erosion and Flooding (\$)						54,000
Protective Structure Cost (\$)	1	2400		2400	2400	7,000
Total Damages (\$)	2	10650	10500	150	21100	61,000

Total Identified Residential Properties: 26 Self-Administered Assessment Respondents: 9

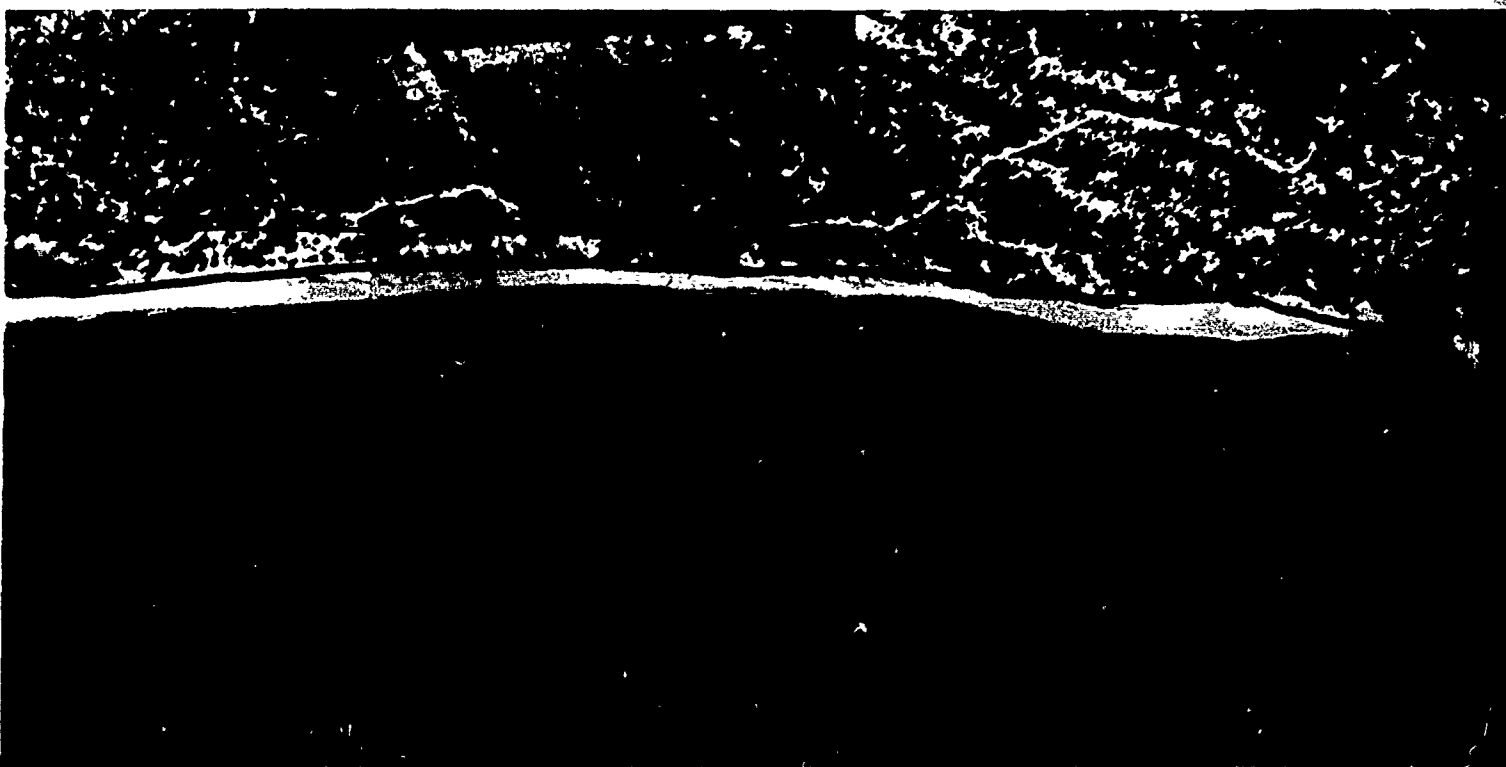


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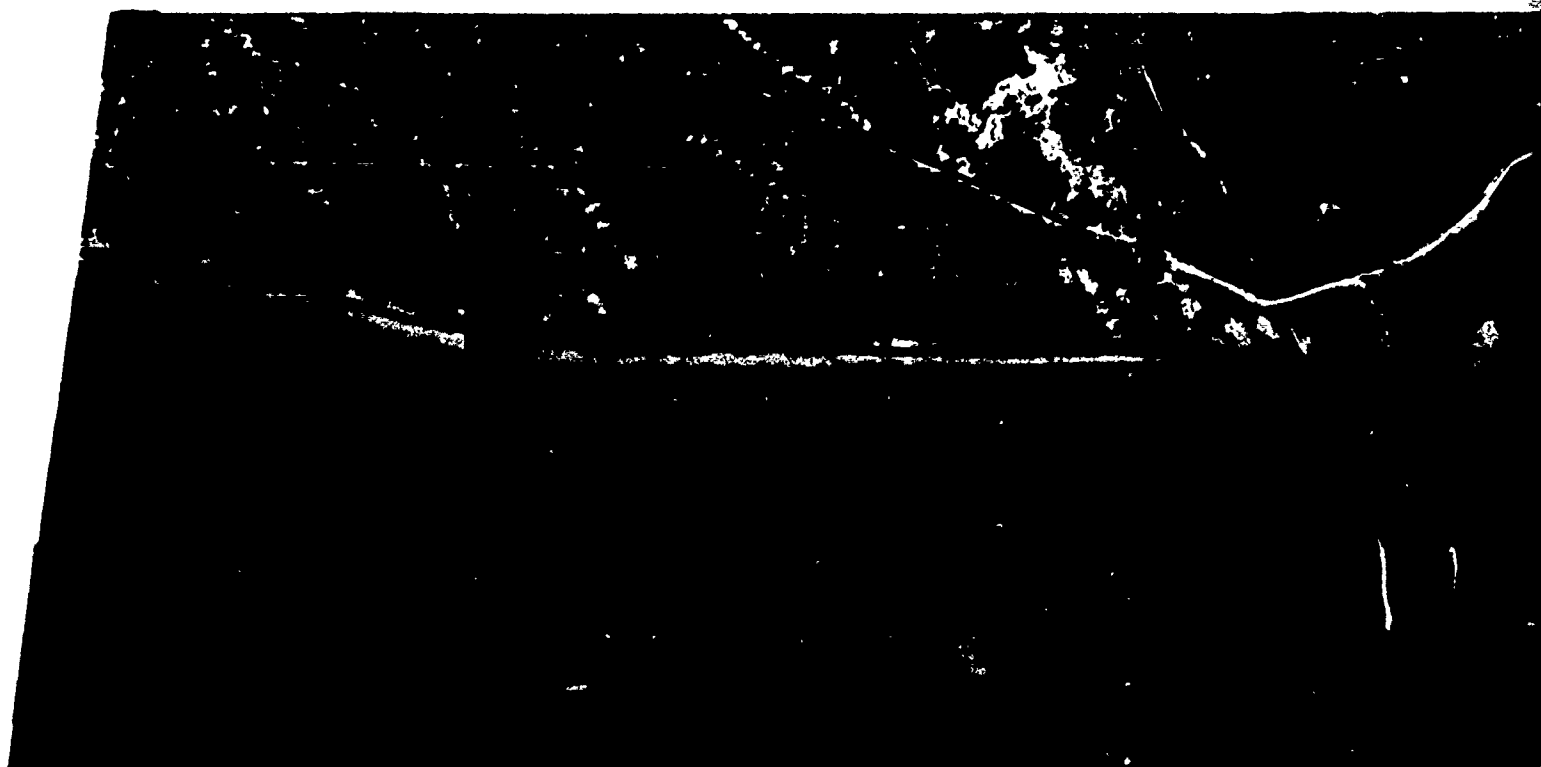


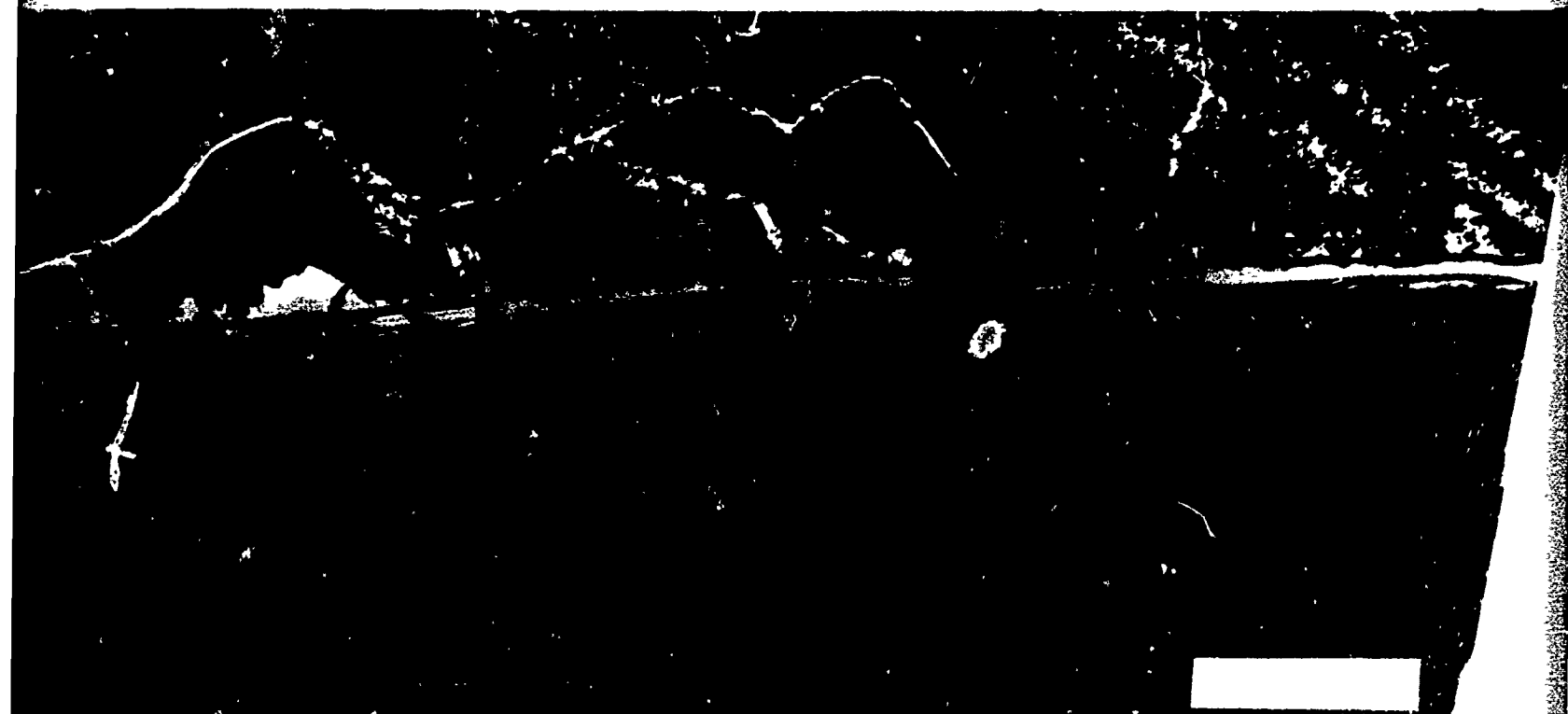
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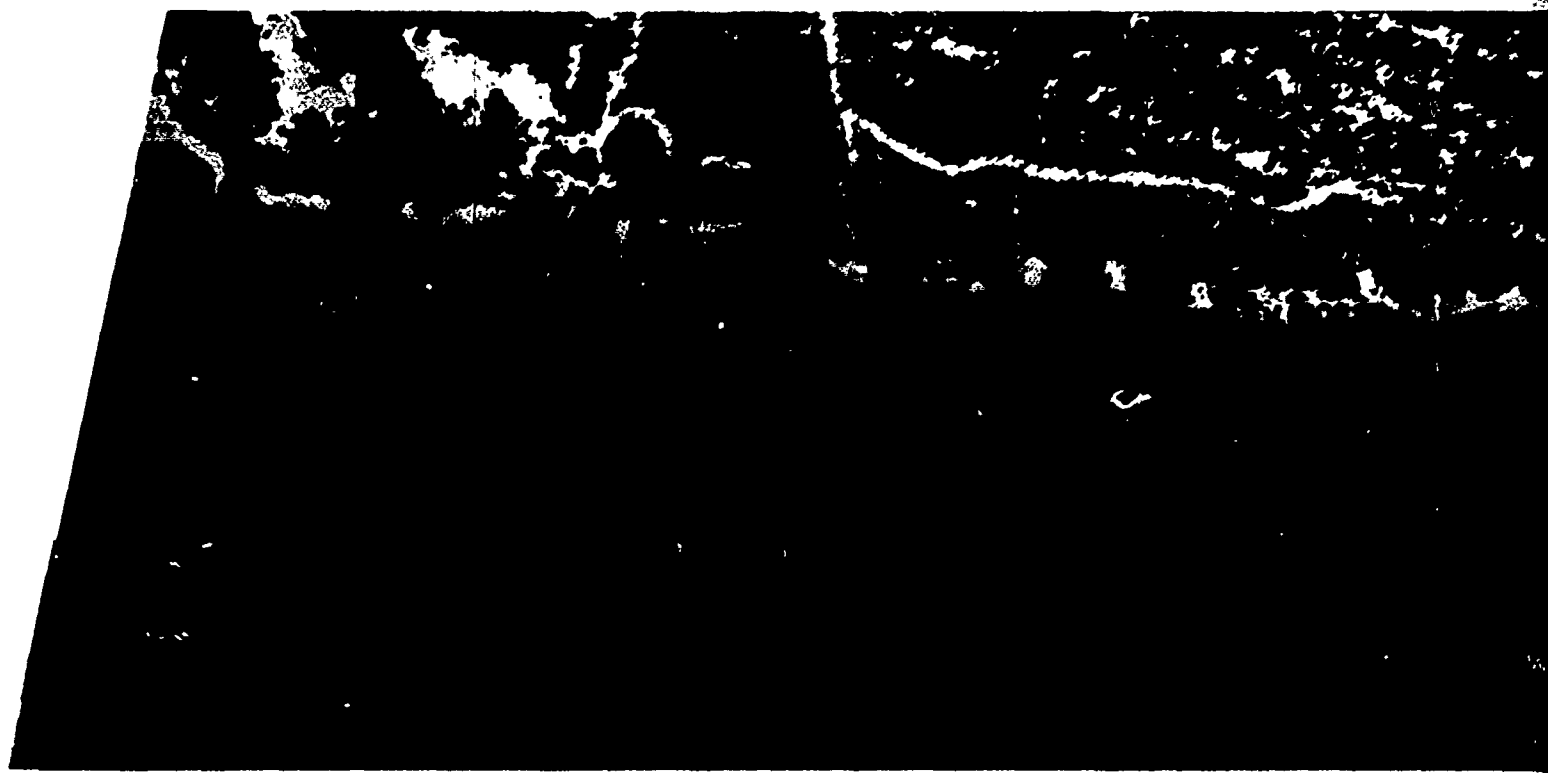


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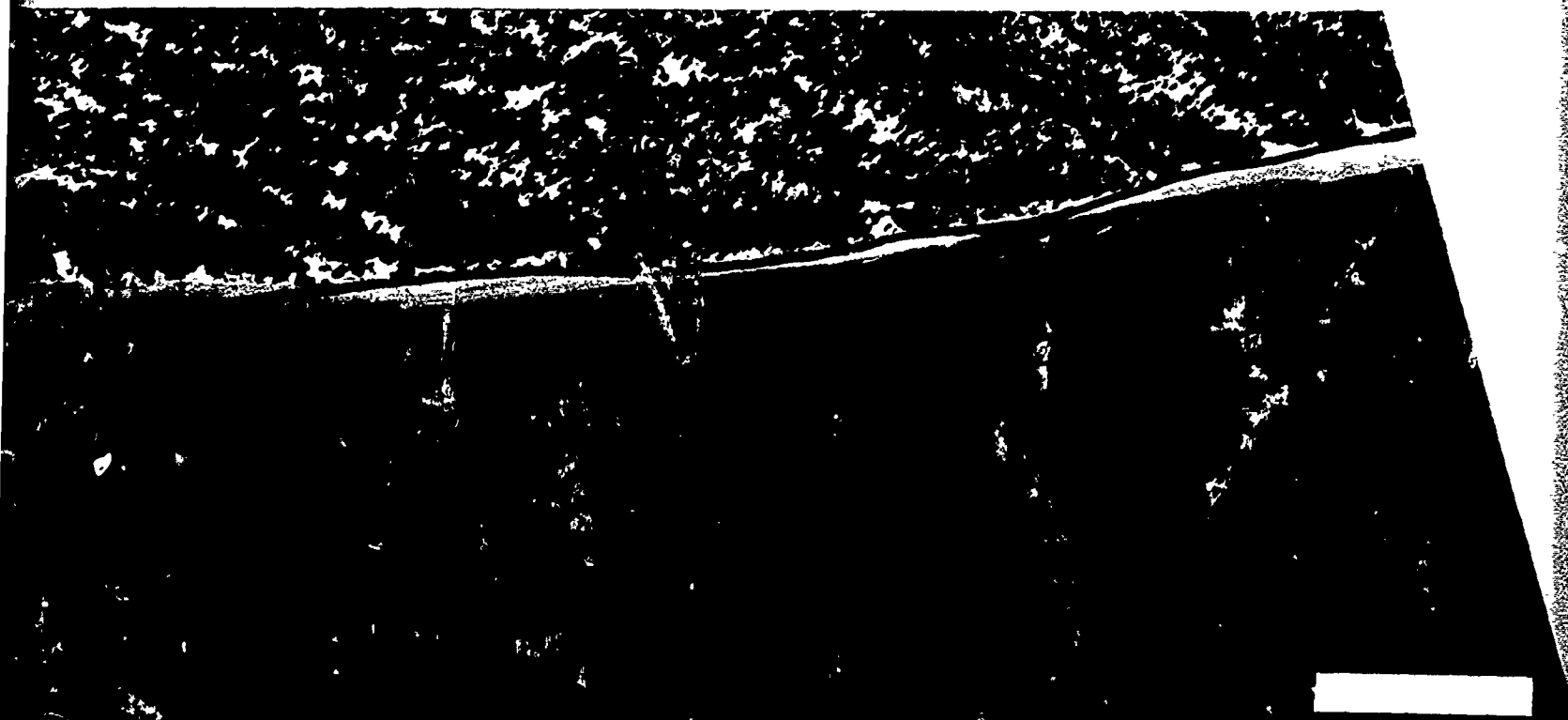




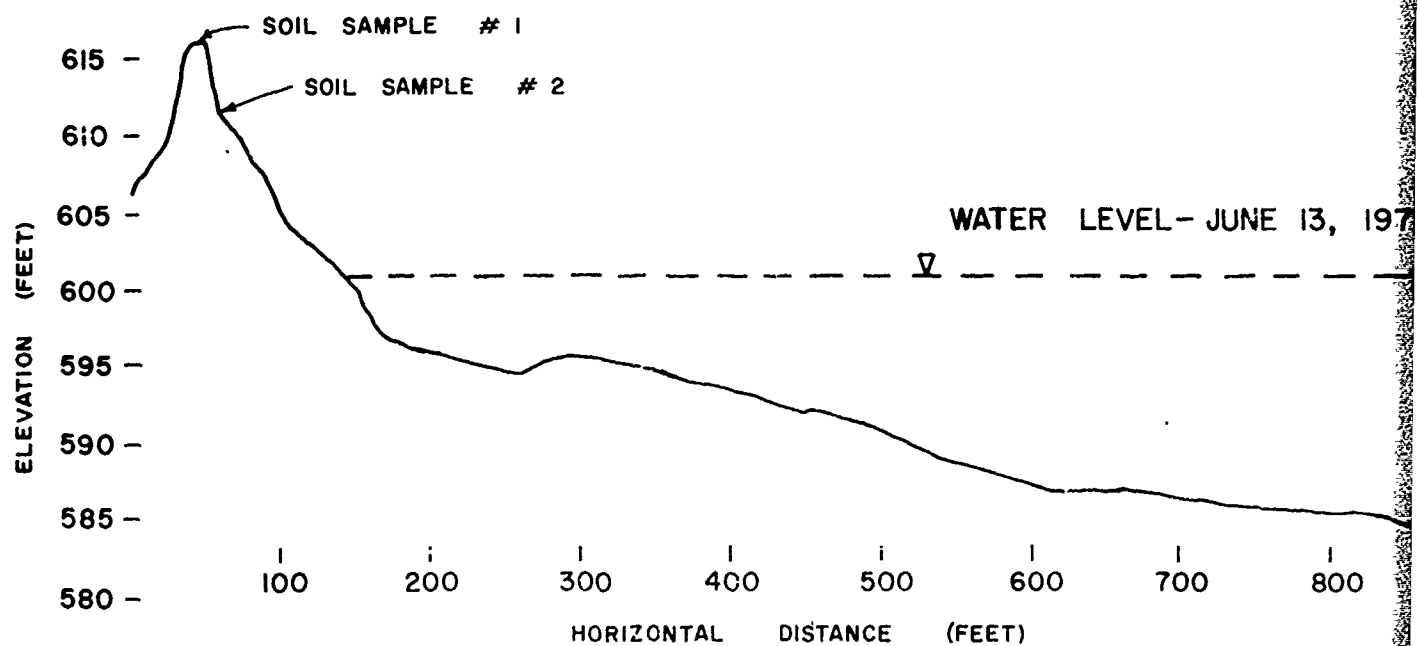
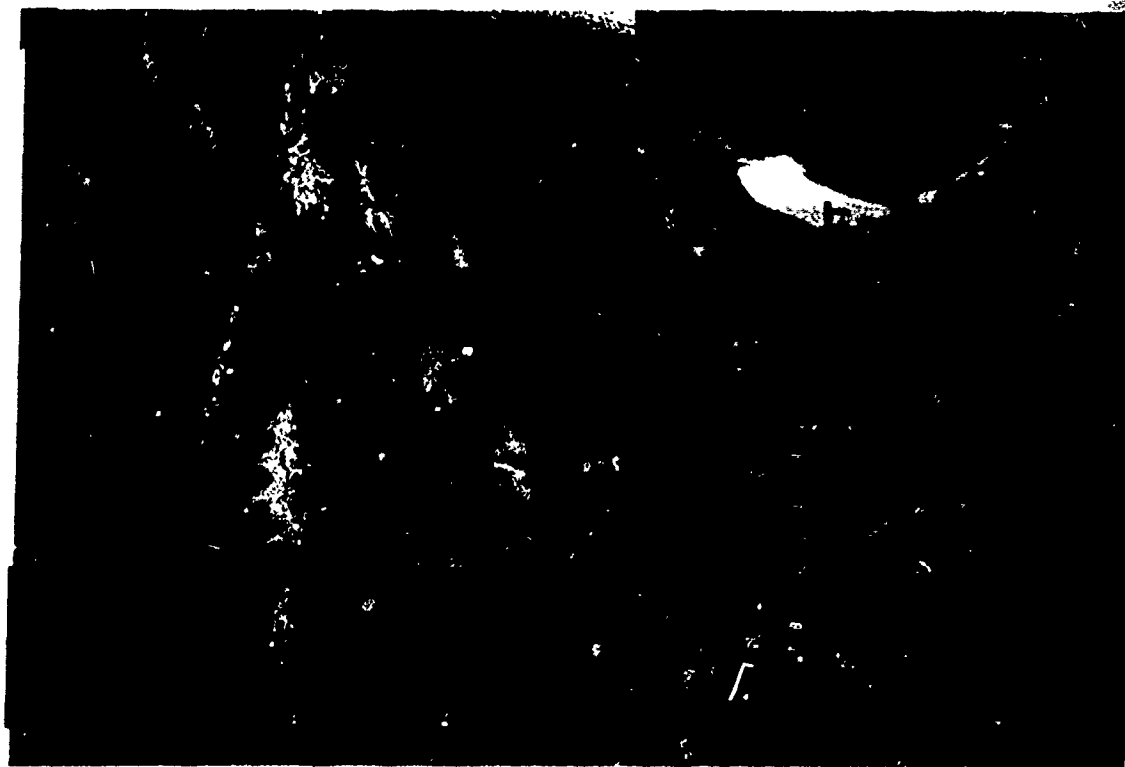
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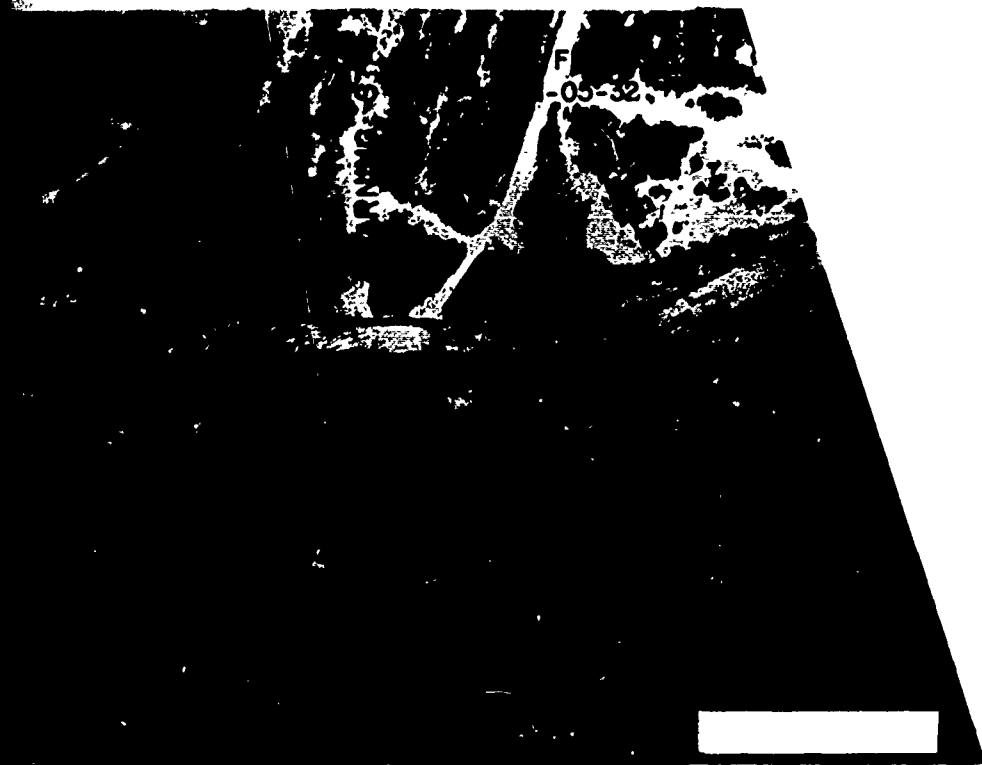


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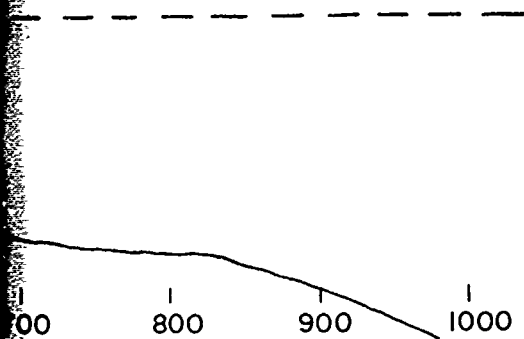
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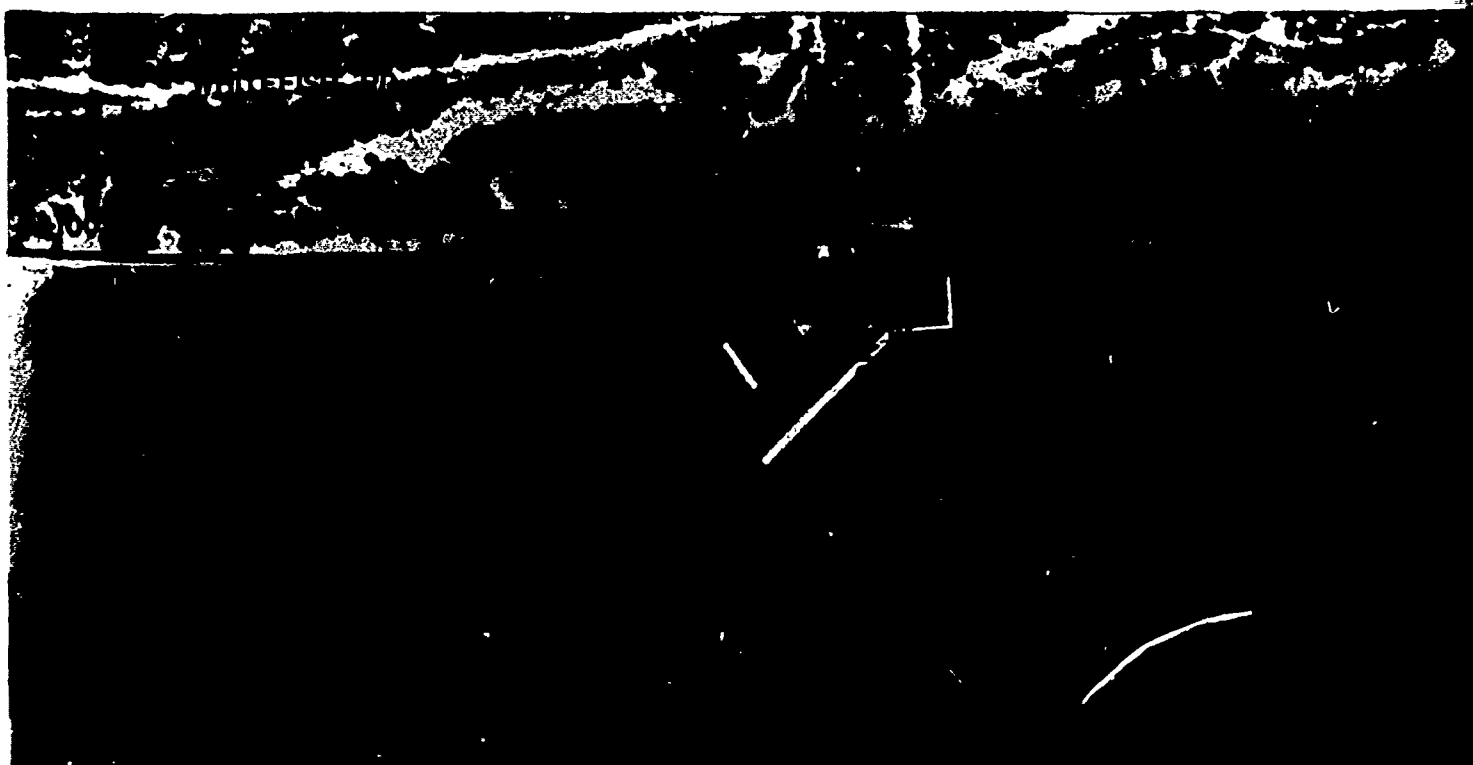
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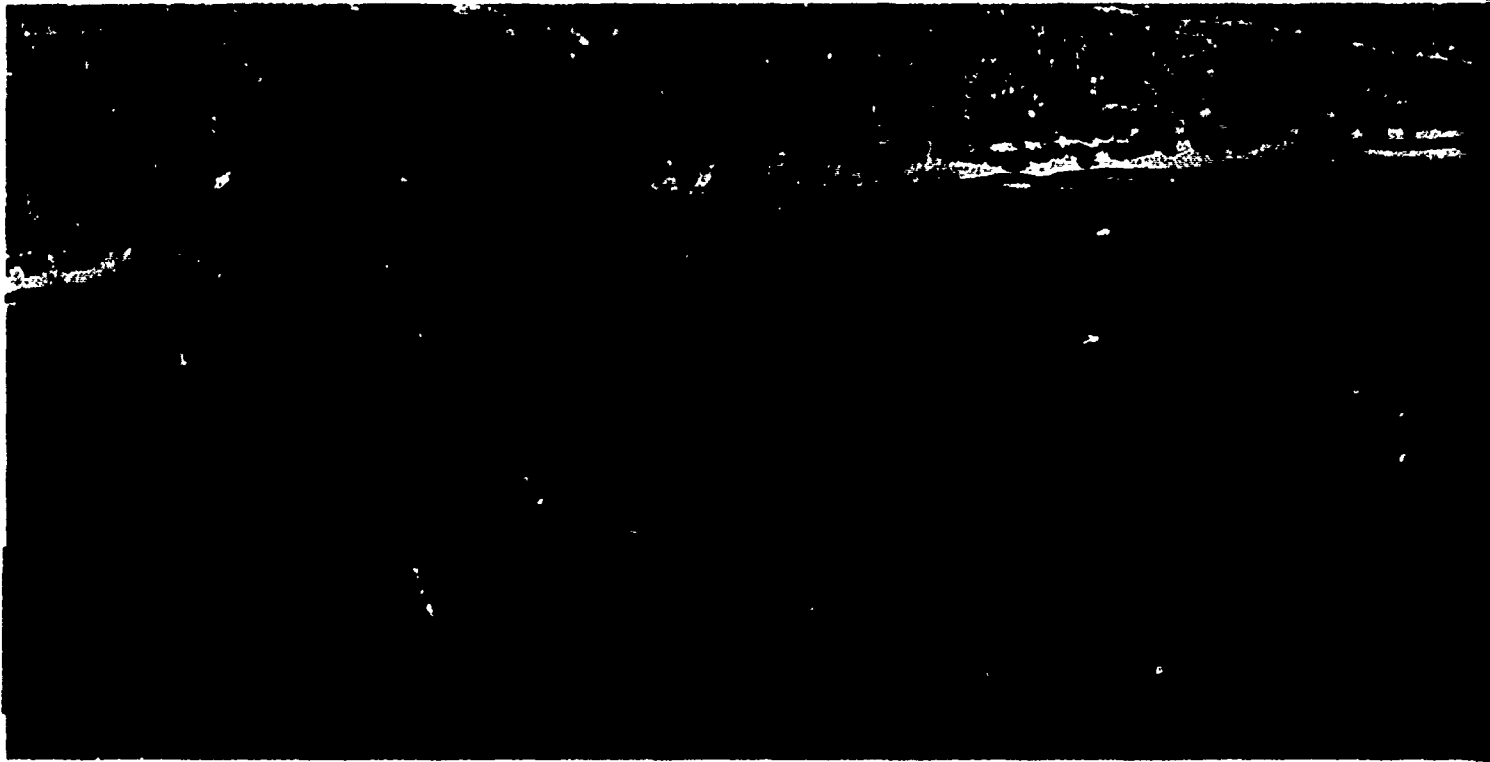
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				Minimum	Maximum	
Assessed Value (\$)	226	5400	300	50	30000	
Reported Market Value (\$)	146	17900	1600	500	125000	
Bluff Height (Ft.)	154	10	1	1	40	
Beach Depth (Ft.)	87	13	2	1	125	
Bluff Lost (Ft.)	129	15	1	1	99	
Beach Lost (Ft.)	147	33	4	3	500	
Damages Erosion (\$)	101	4250	600	35	36250	
Damages Flooding (\$)	37	3200	800	50	25000	
Damages - Erosion and Flooding (\$)						966,000
Protective Structure Cost (\$)	87	4150	1650	50	140000	637,000
Total Damages (\$)	136	6650	1300	100	164900	1,603,000

Total Identified Residential Properties: 401 Self-Administered Assessment Respondents: 226

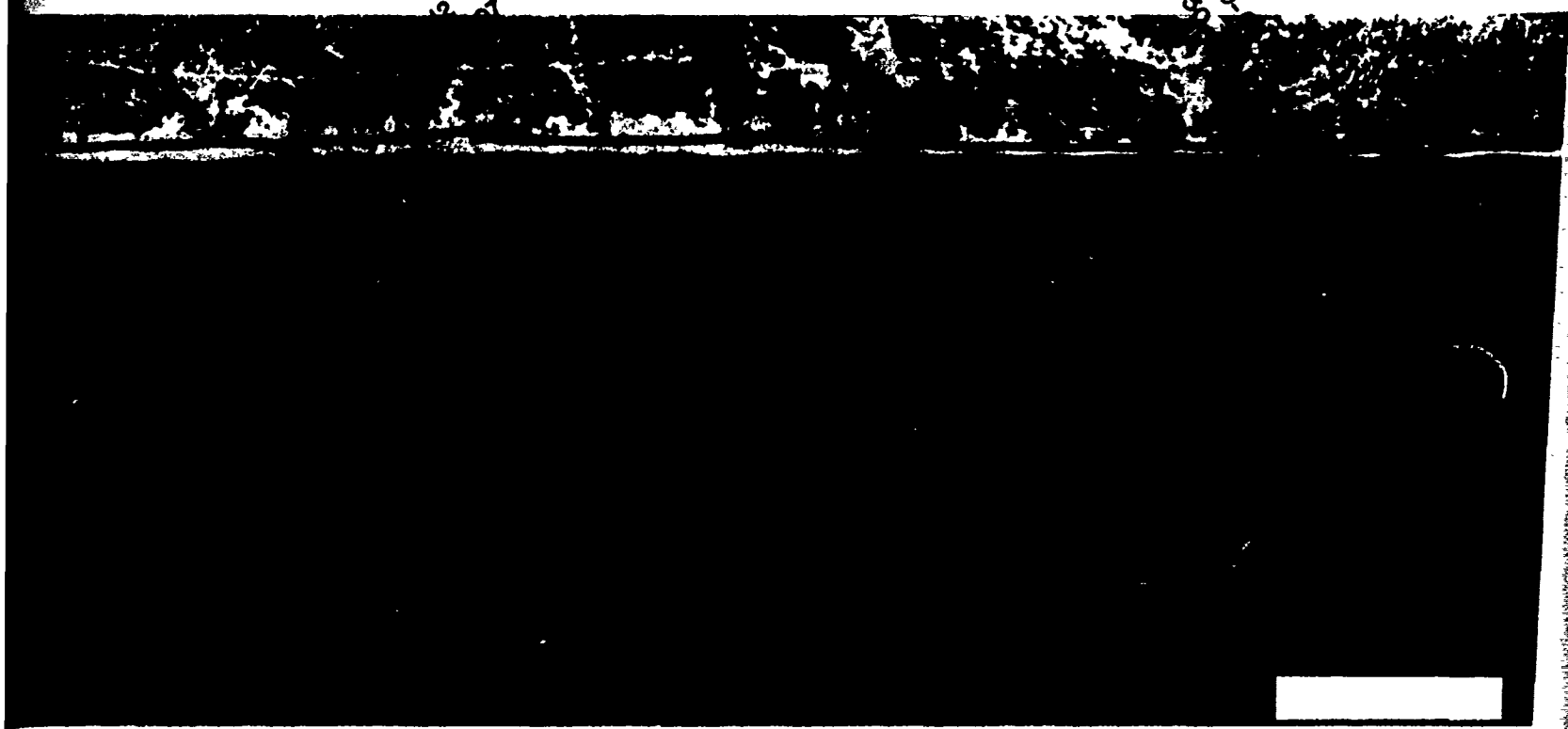


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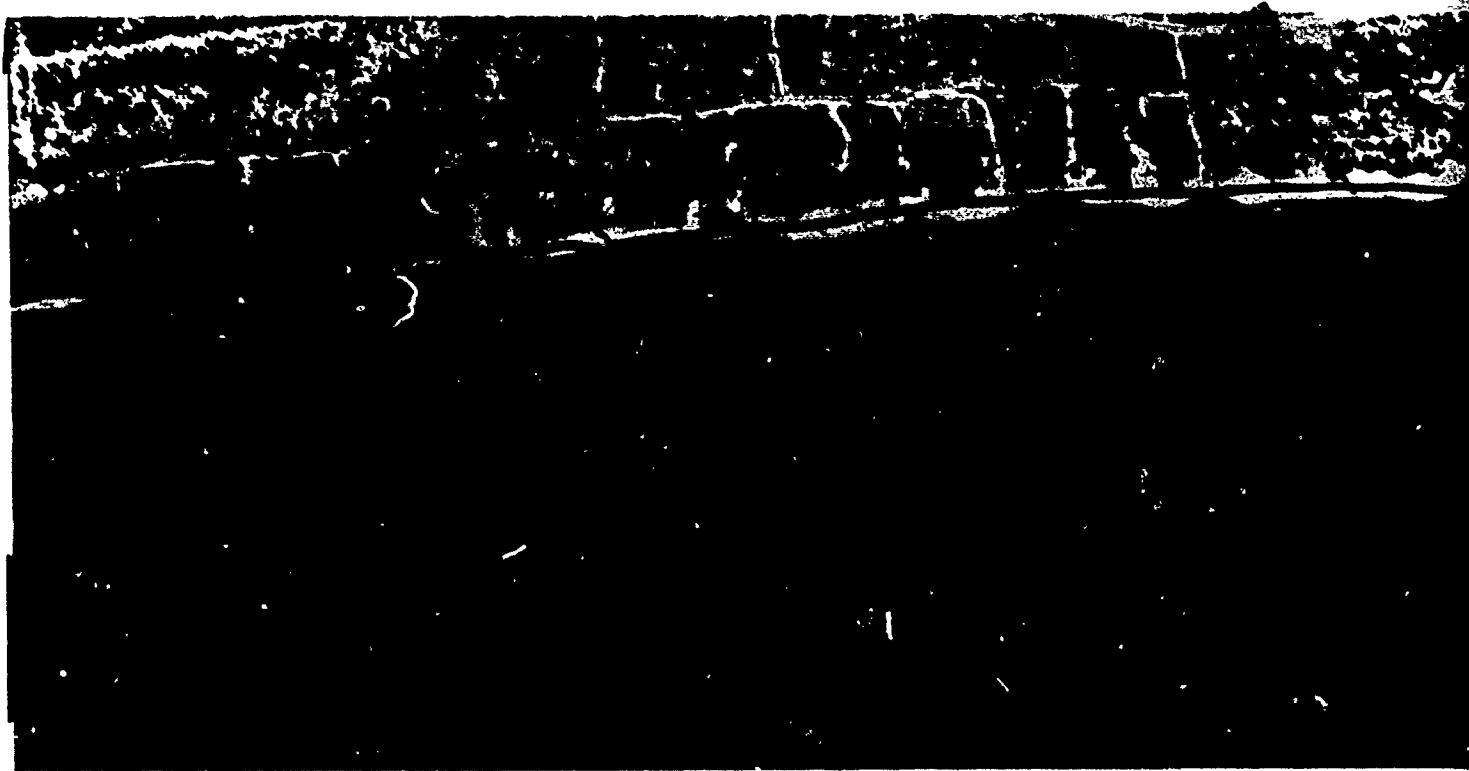
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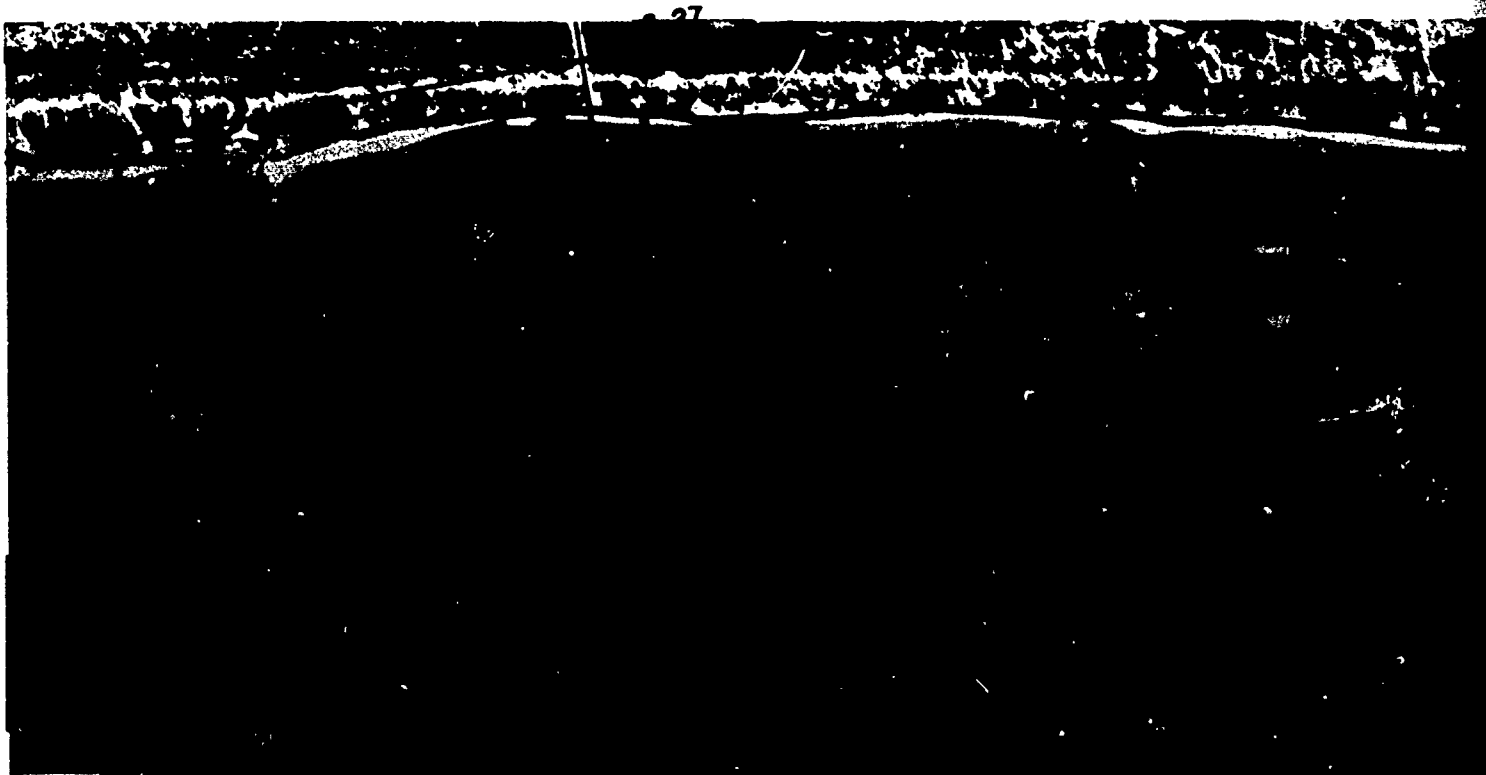
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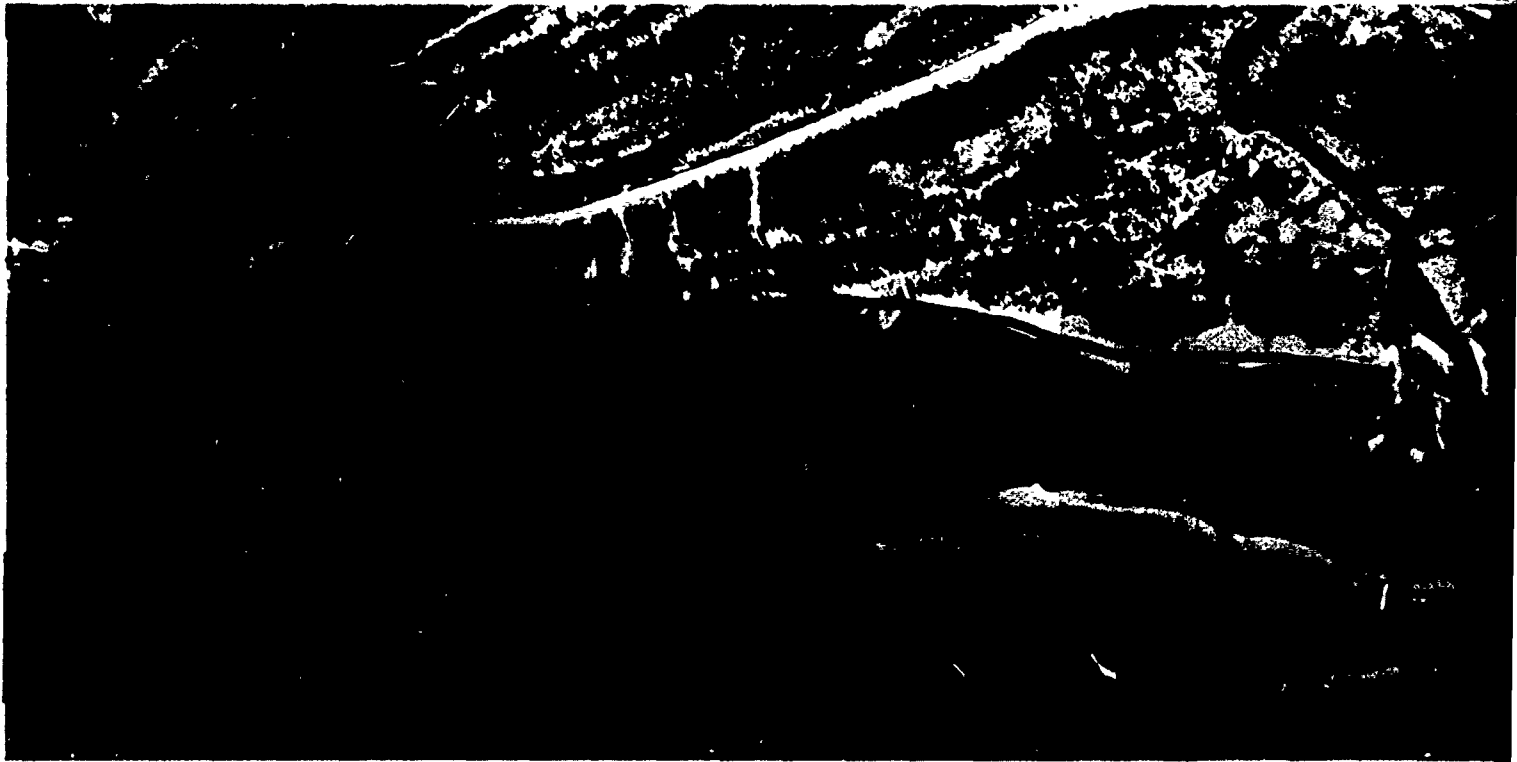
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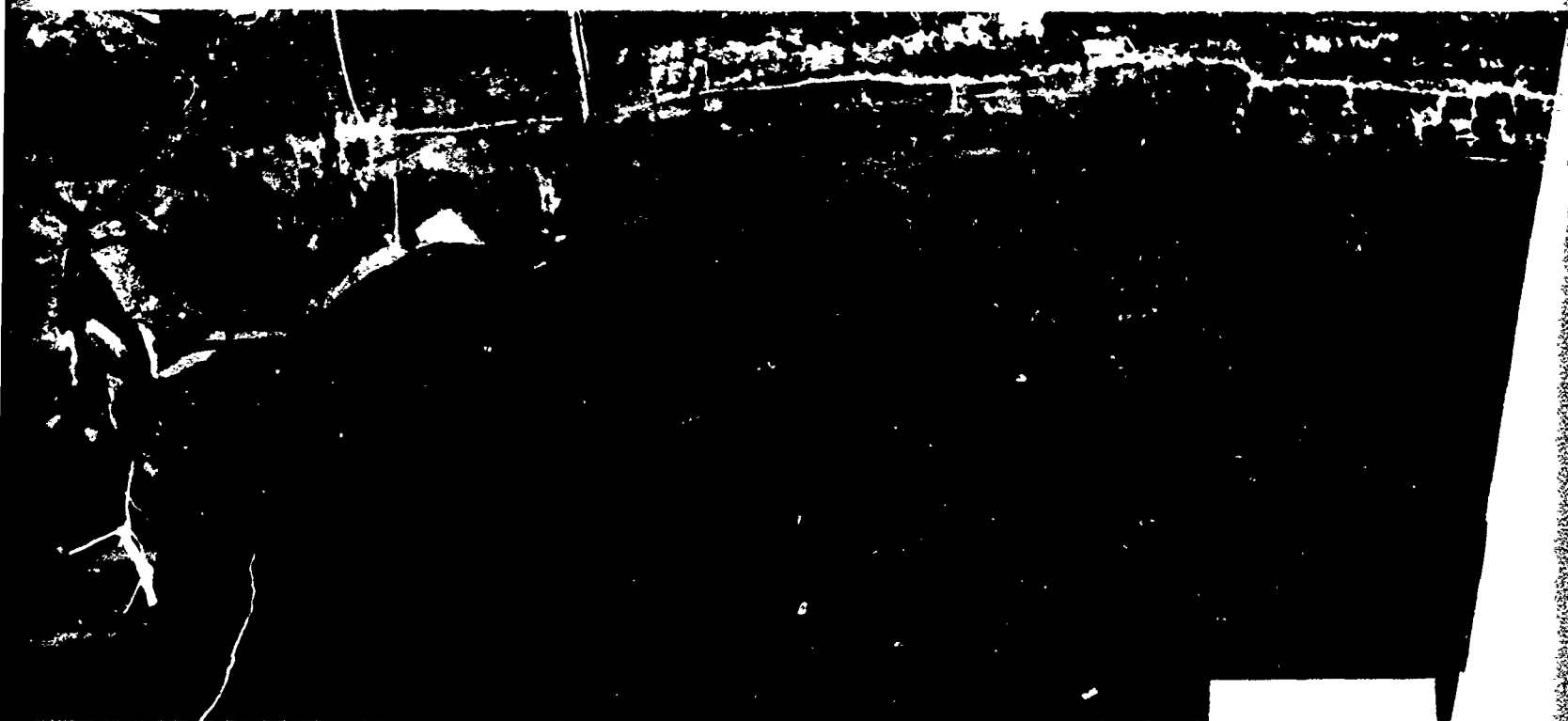


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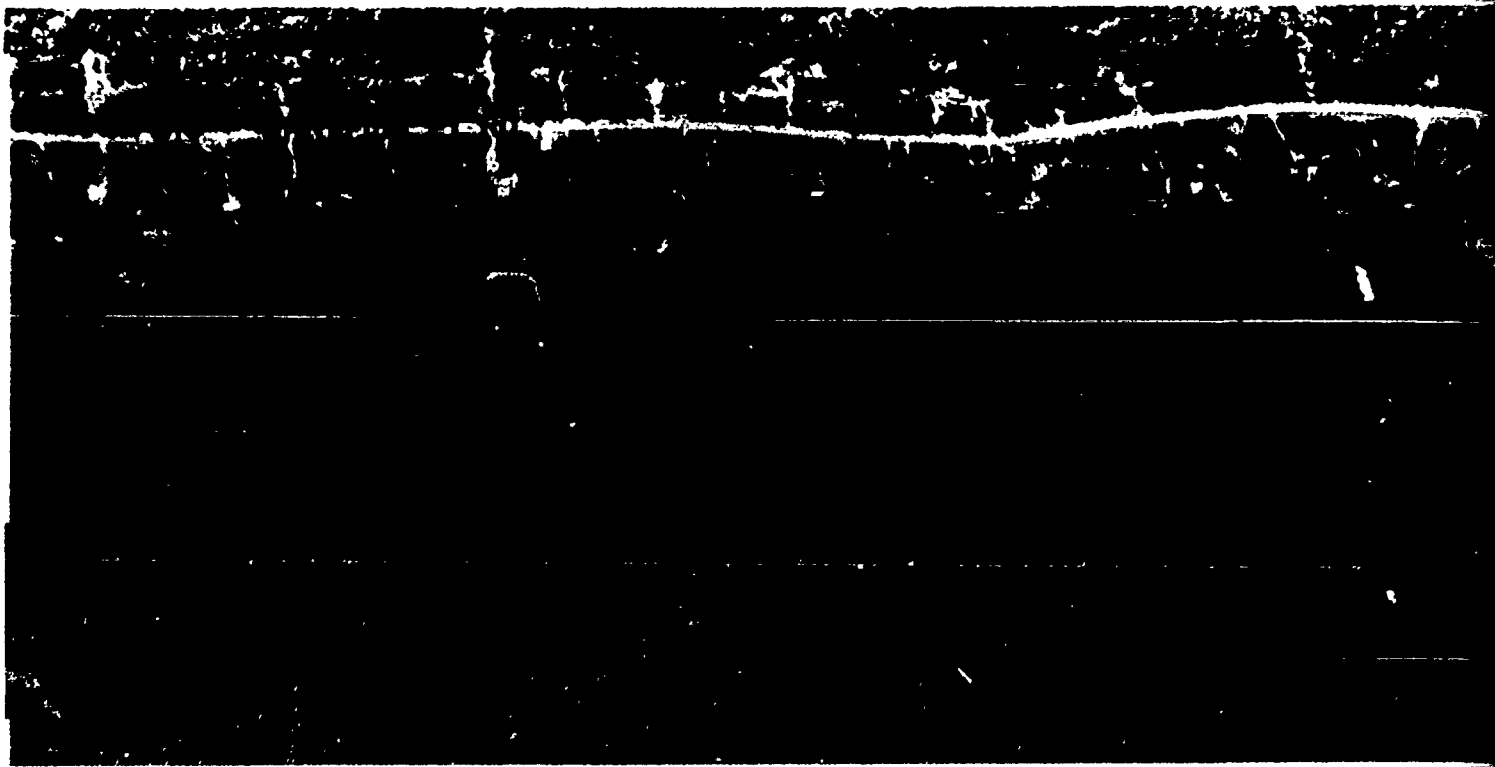




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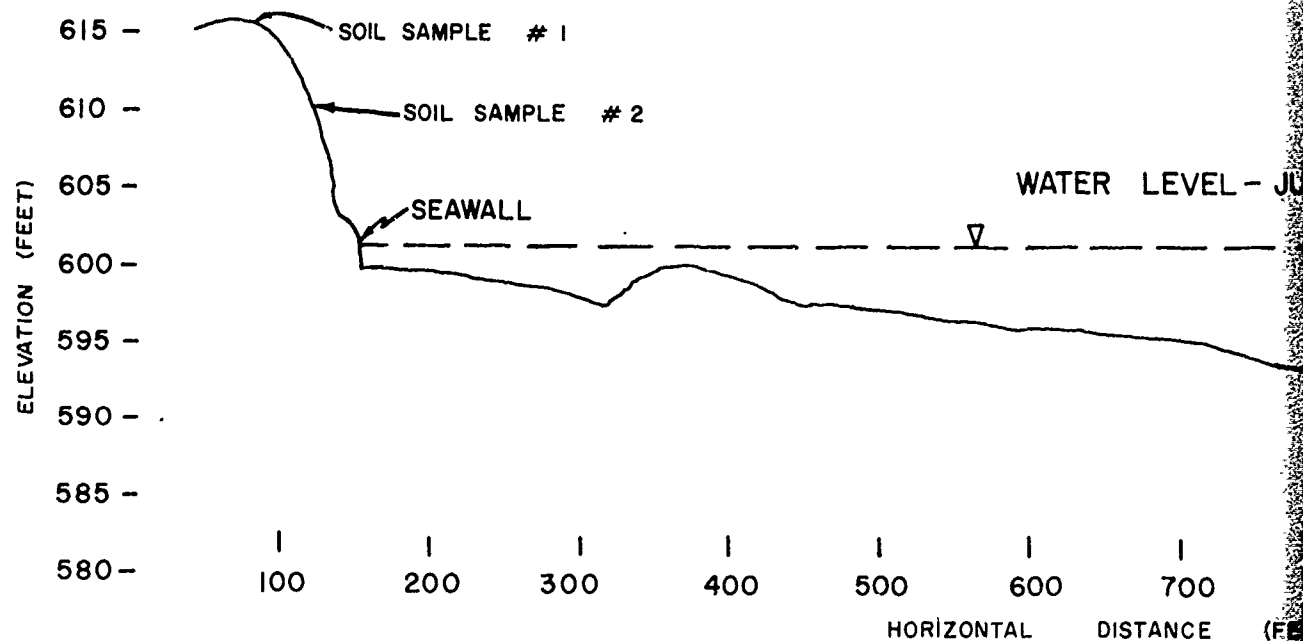
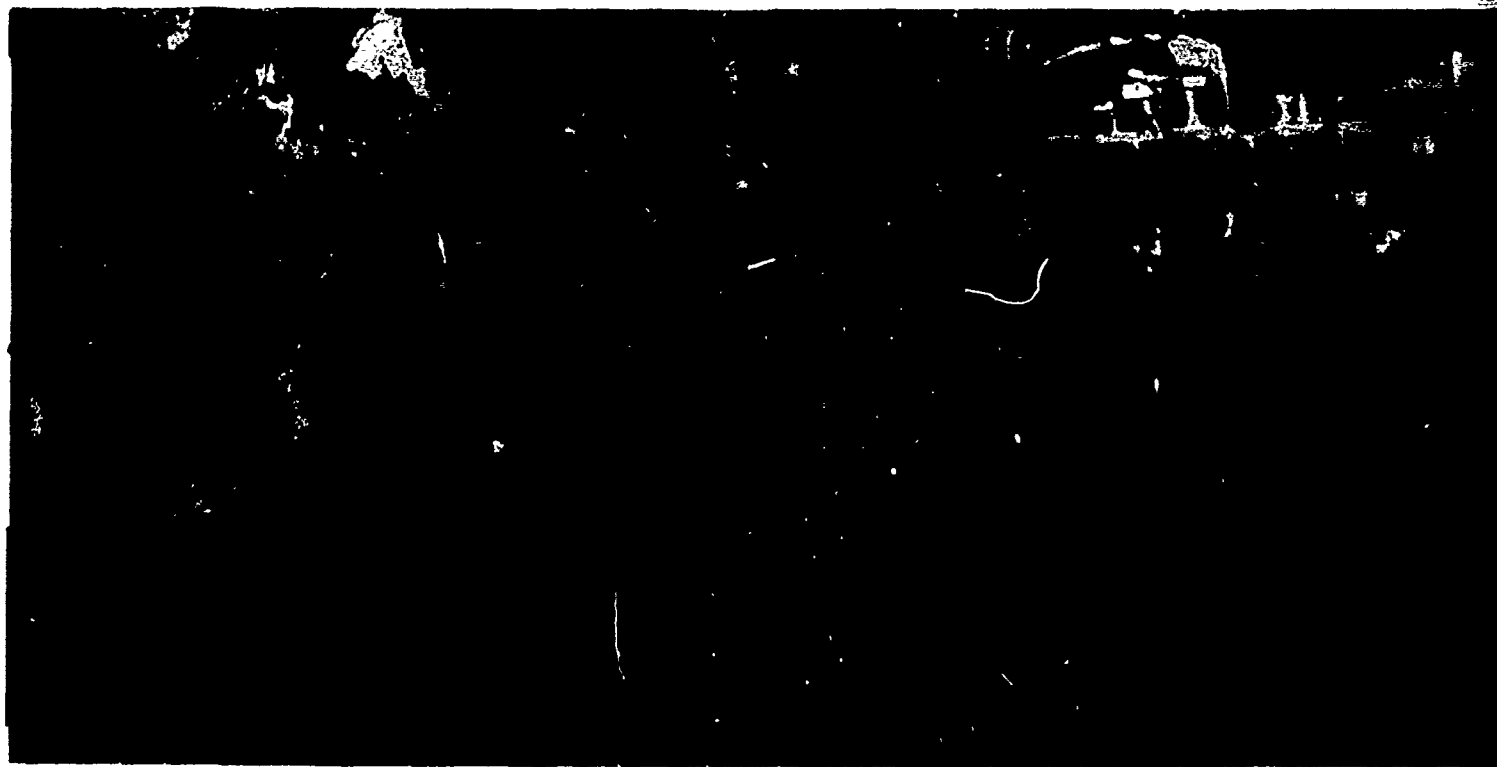
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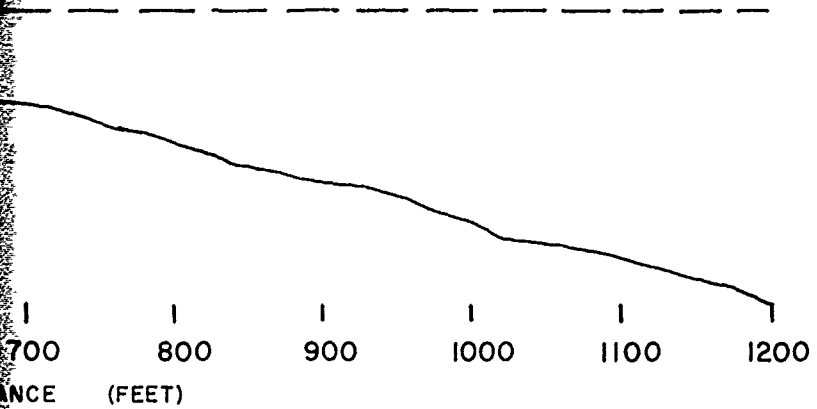
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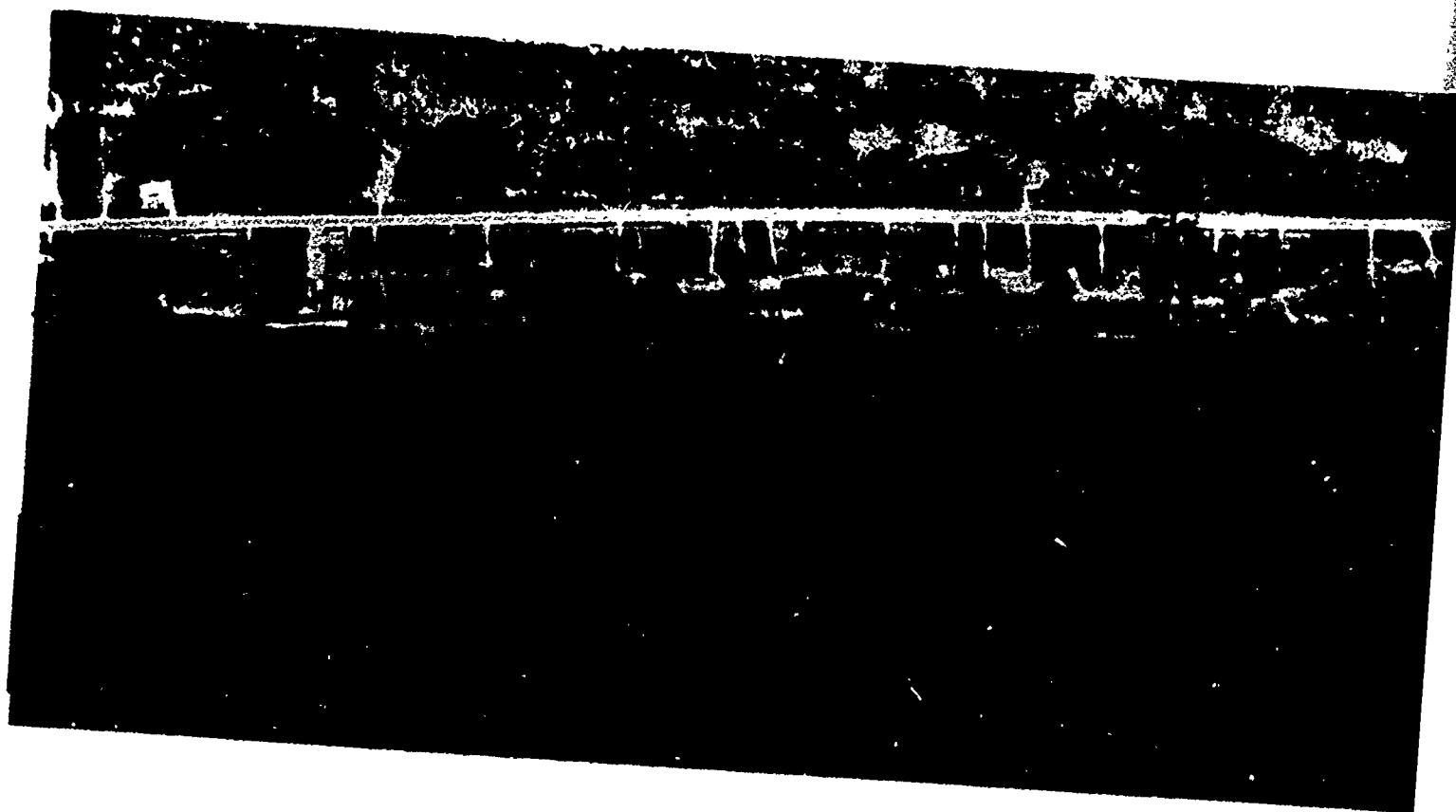
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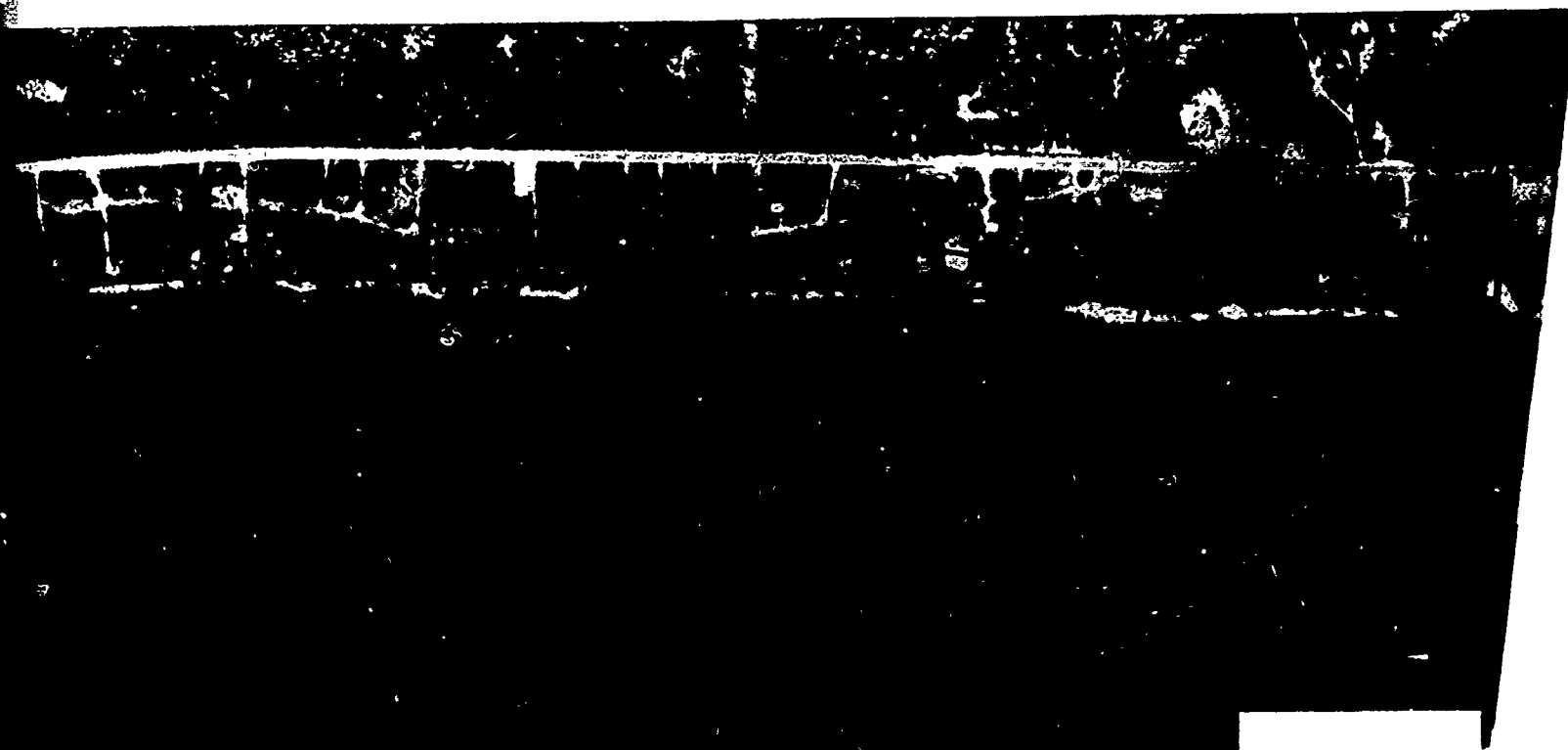


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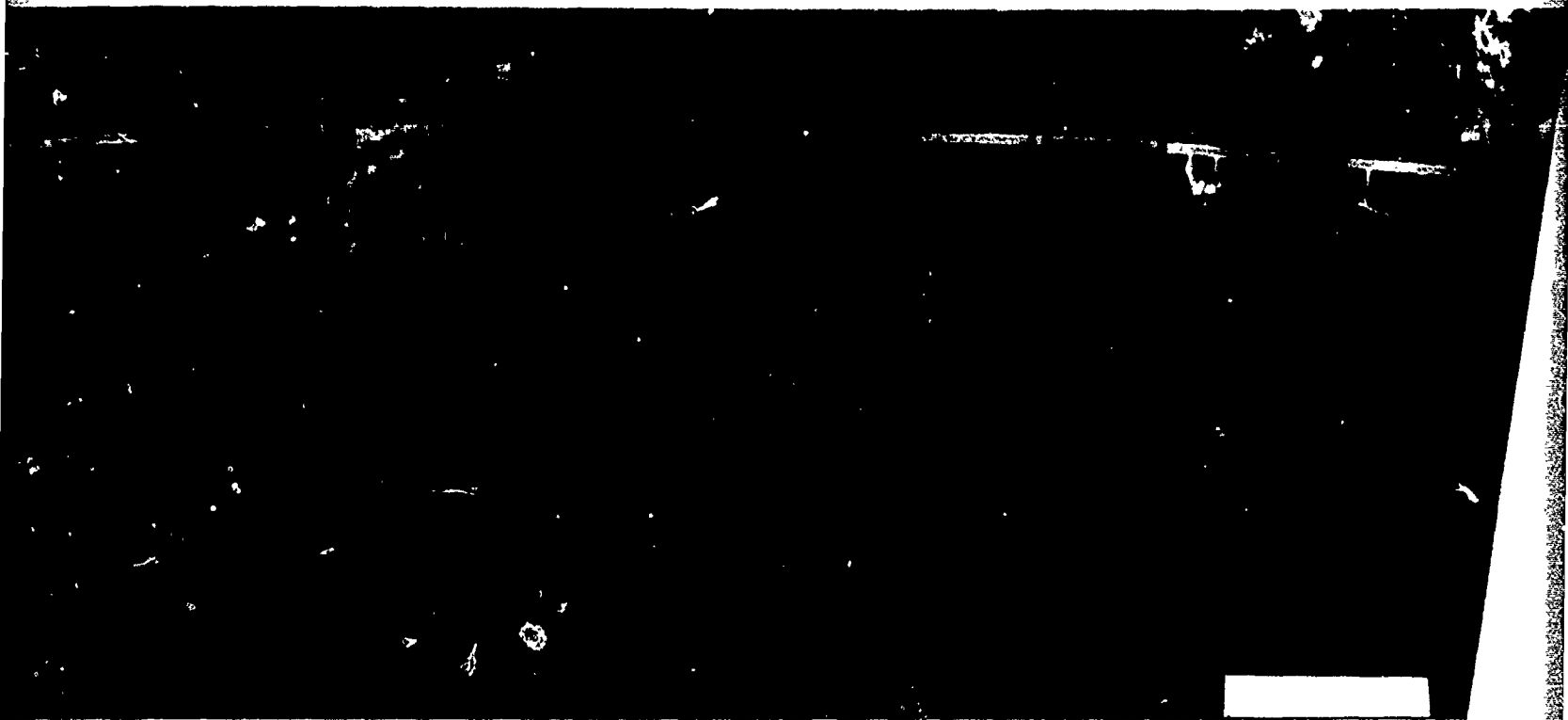


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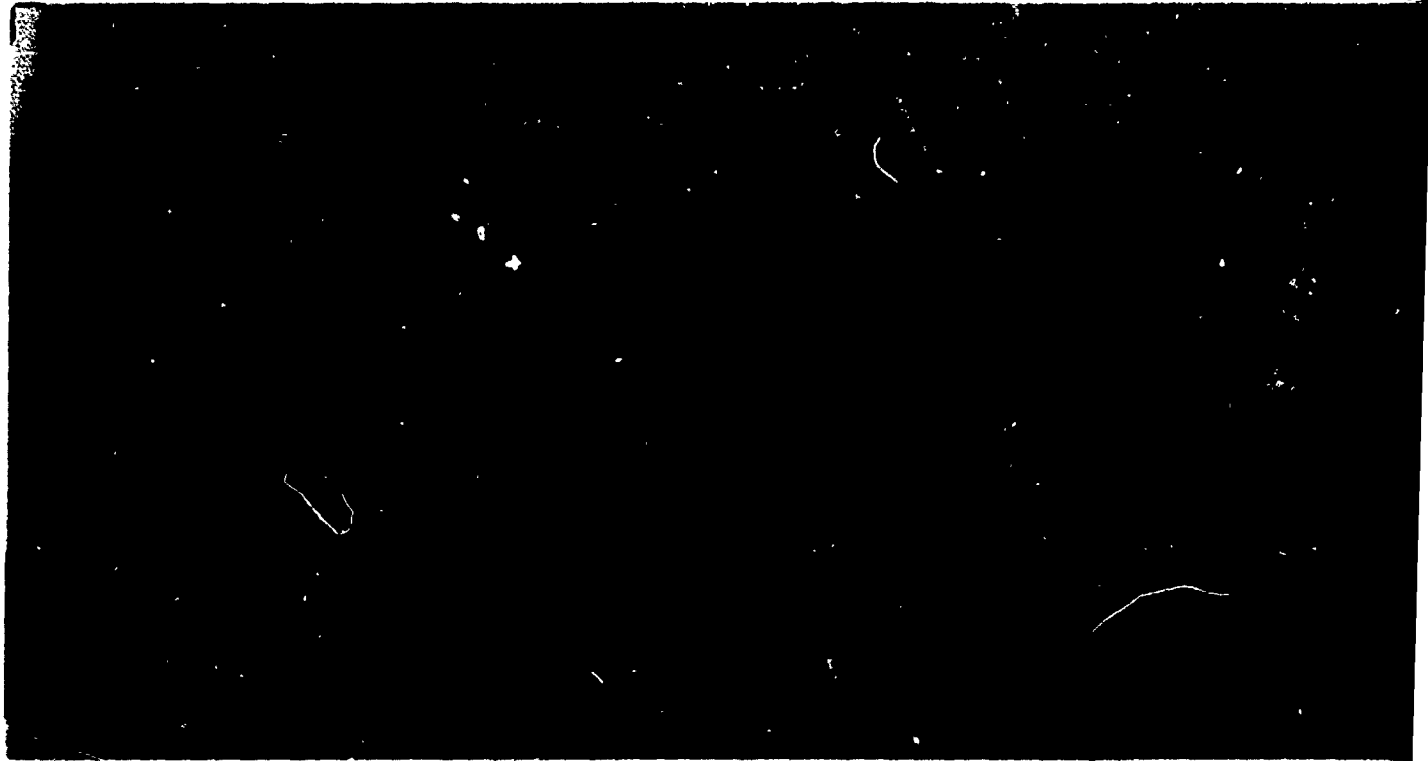
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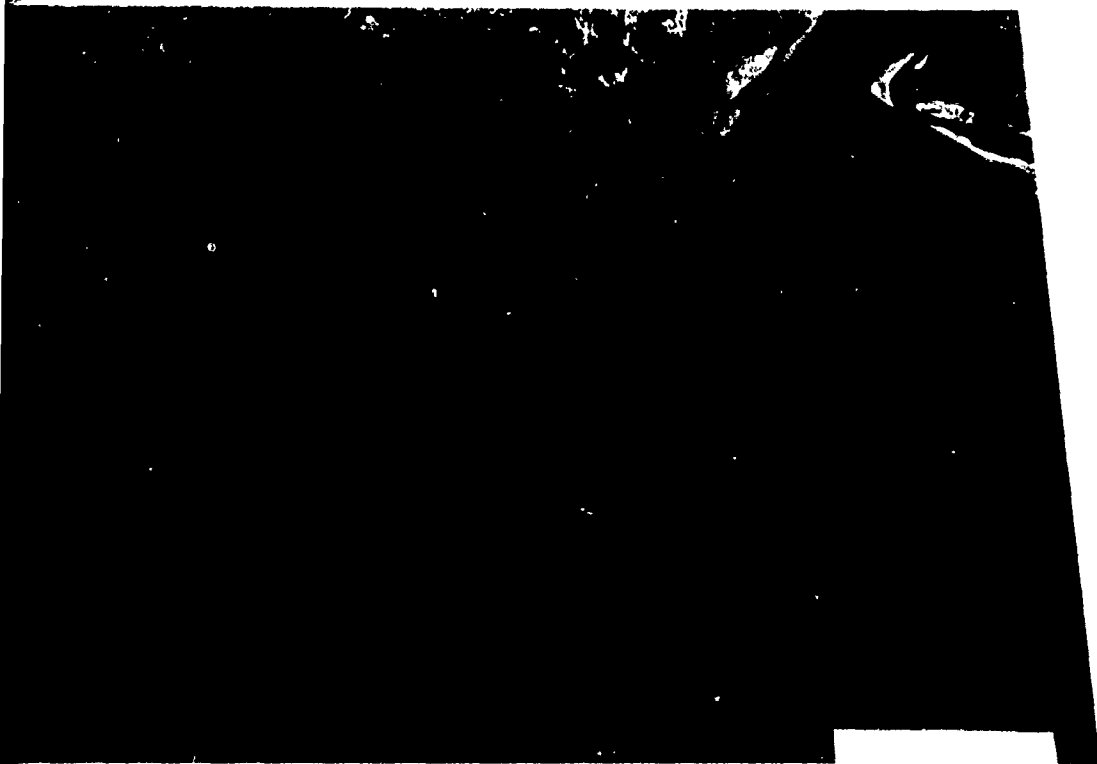


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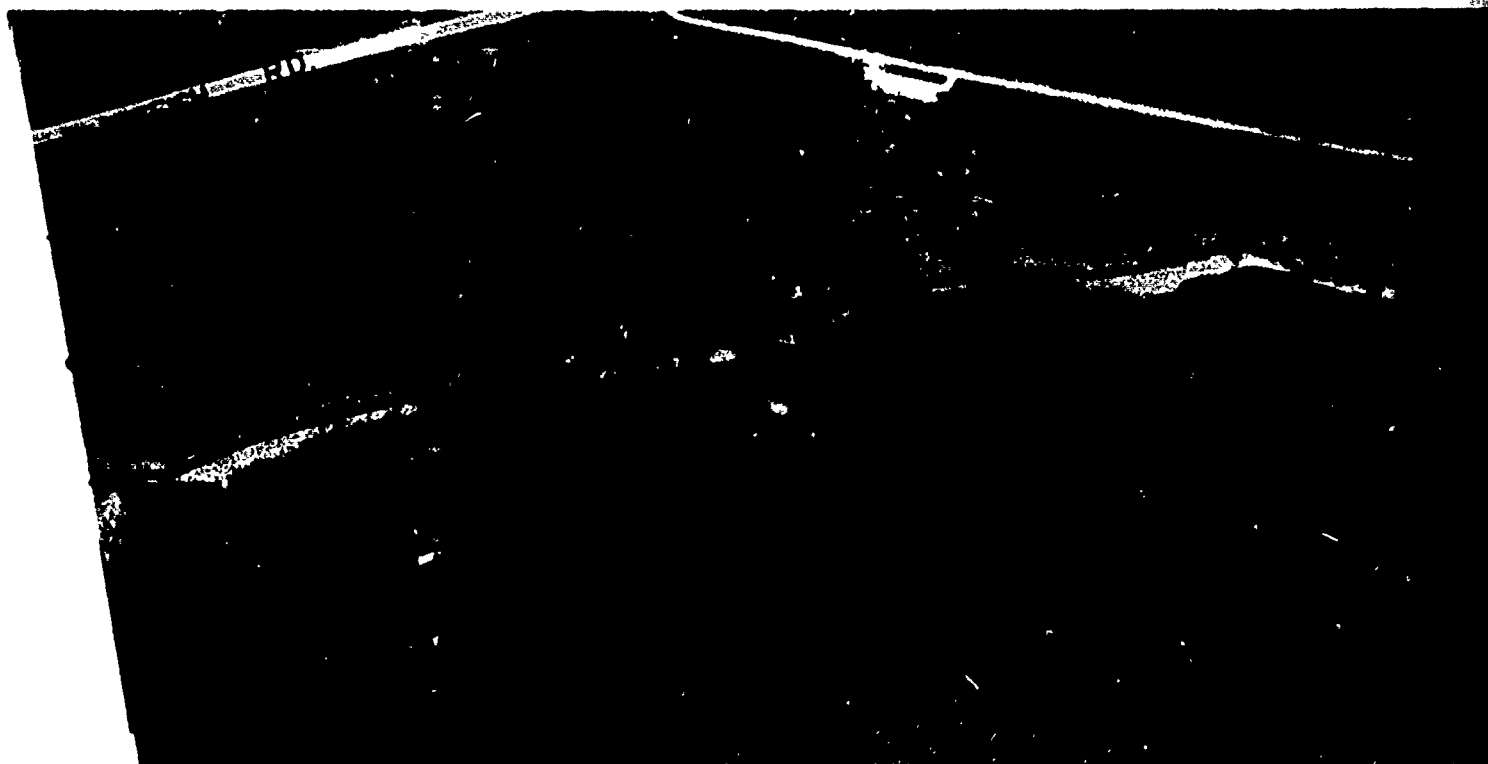
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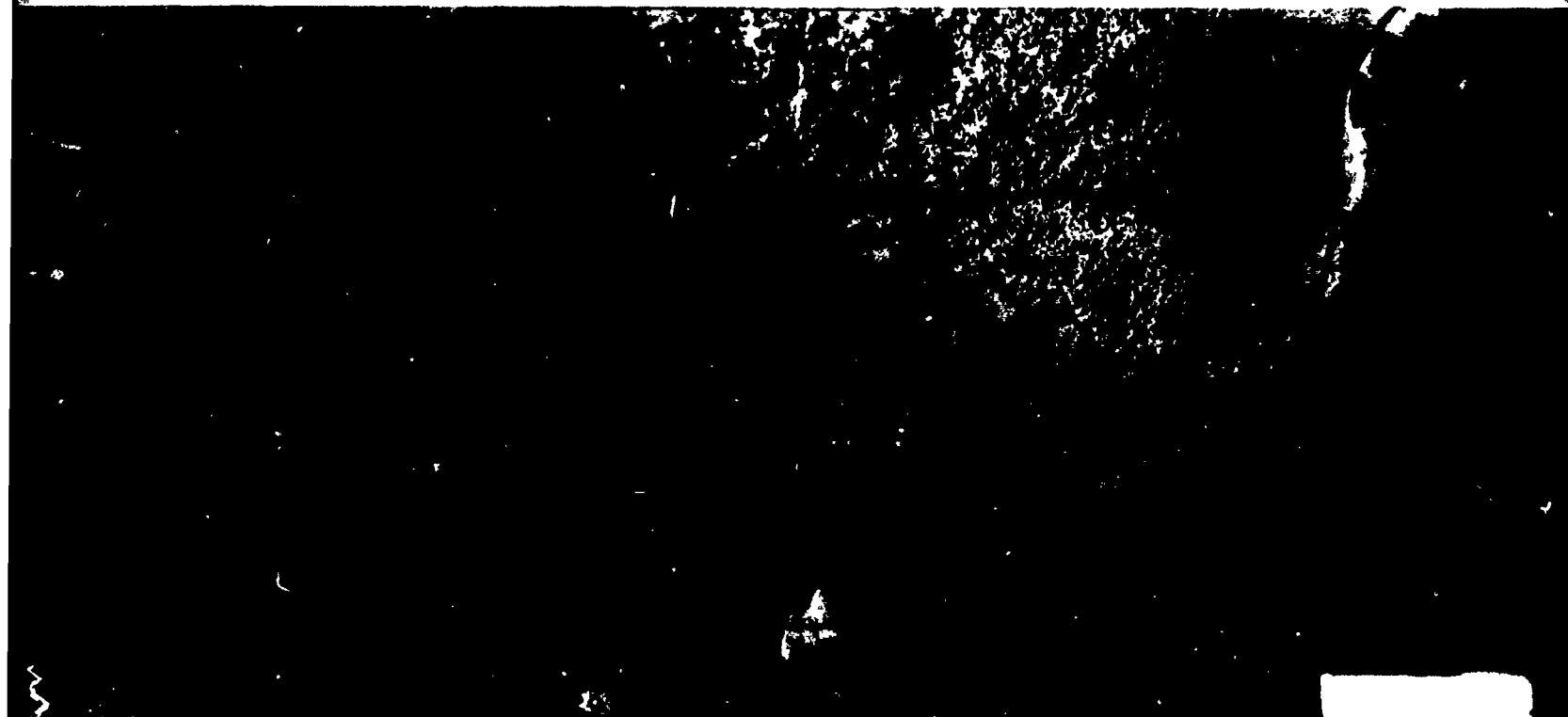


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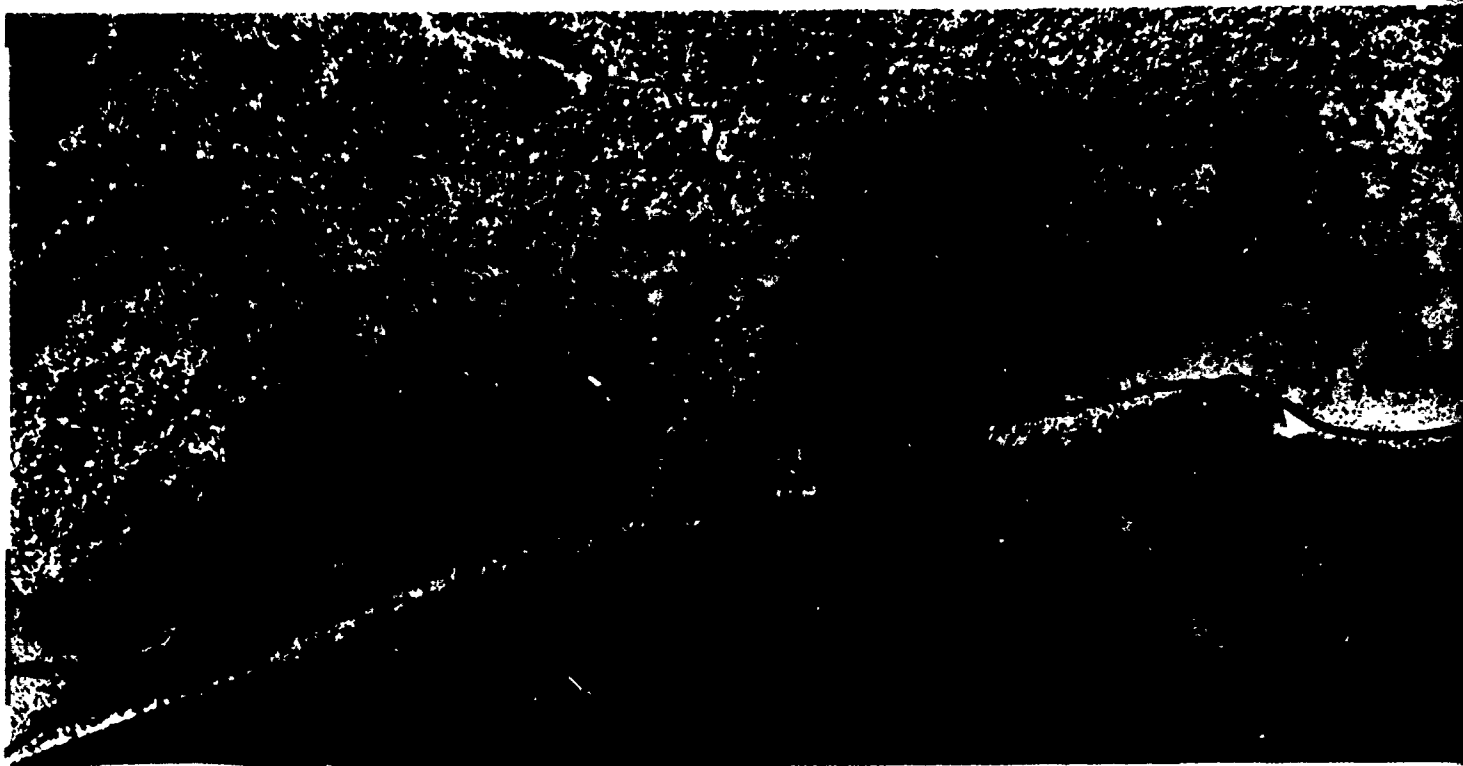


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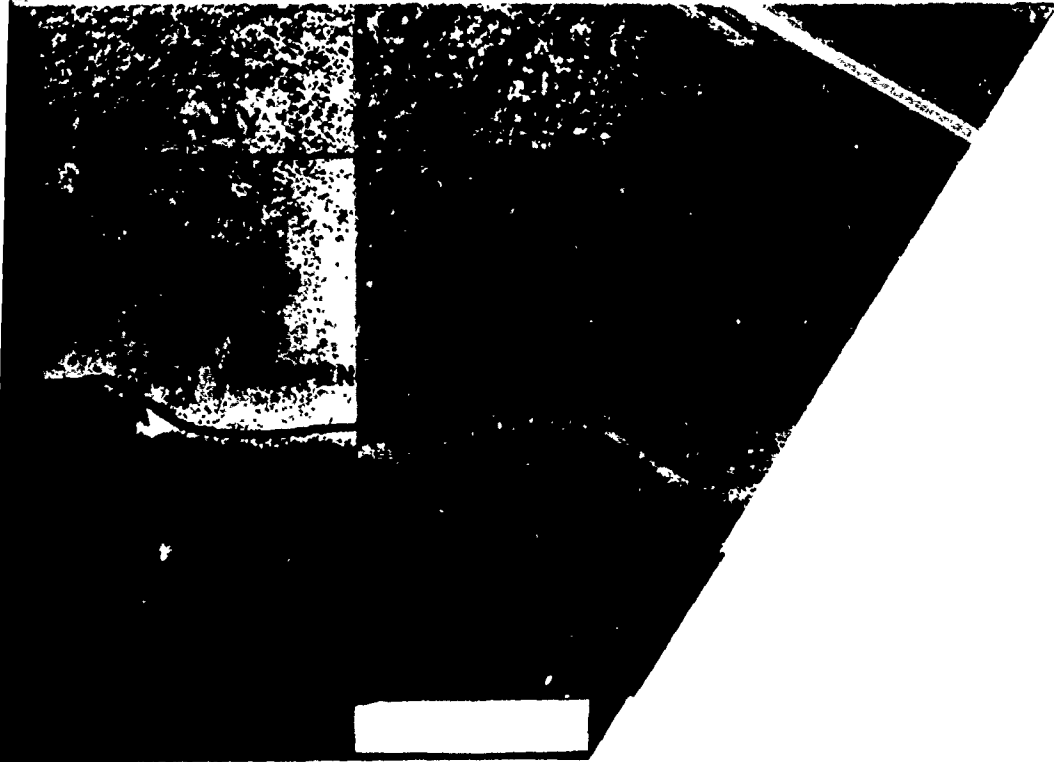
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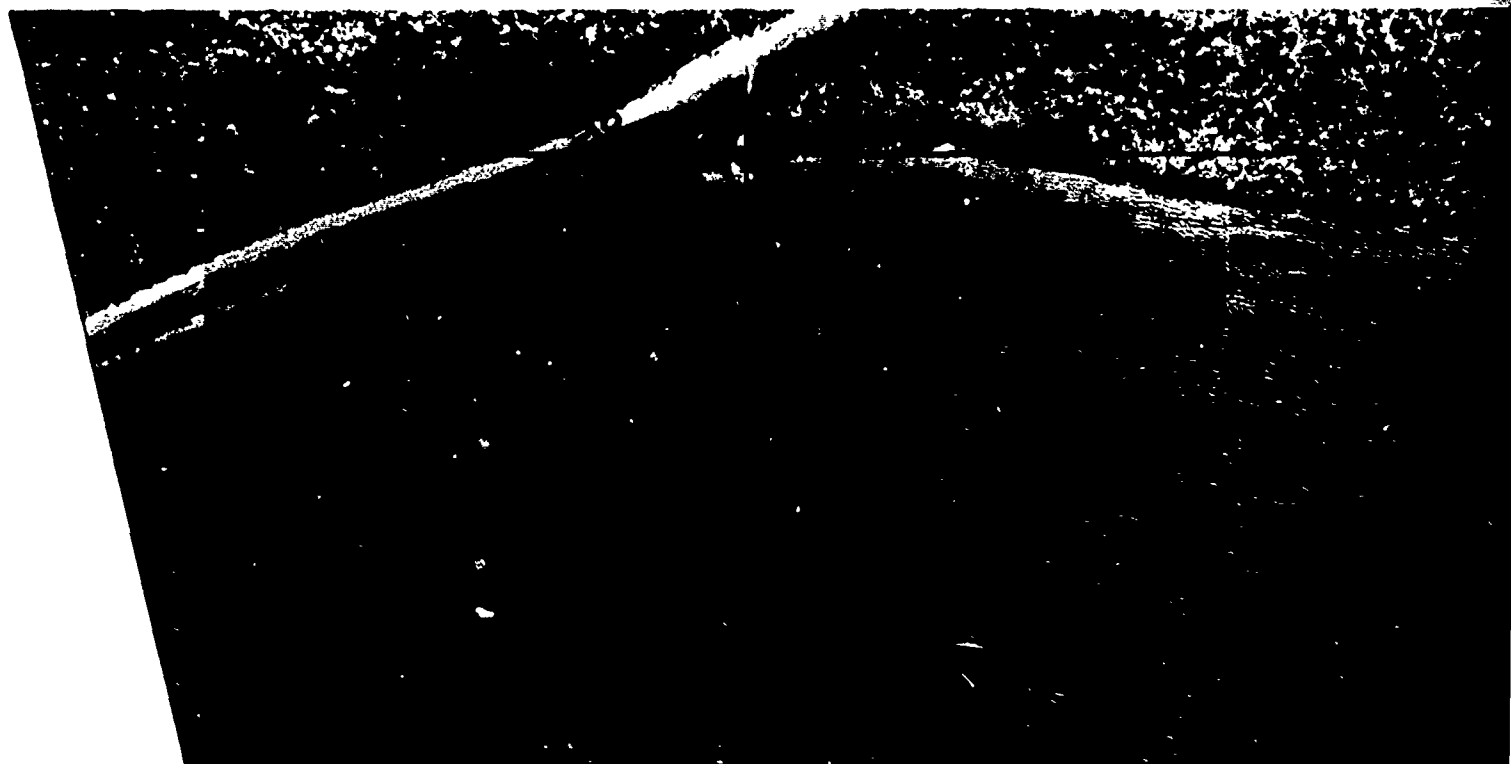
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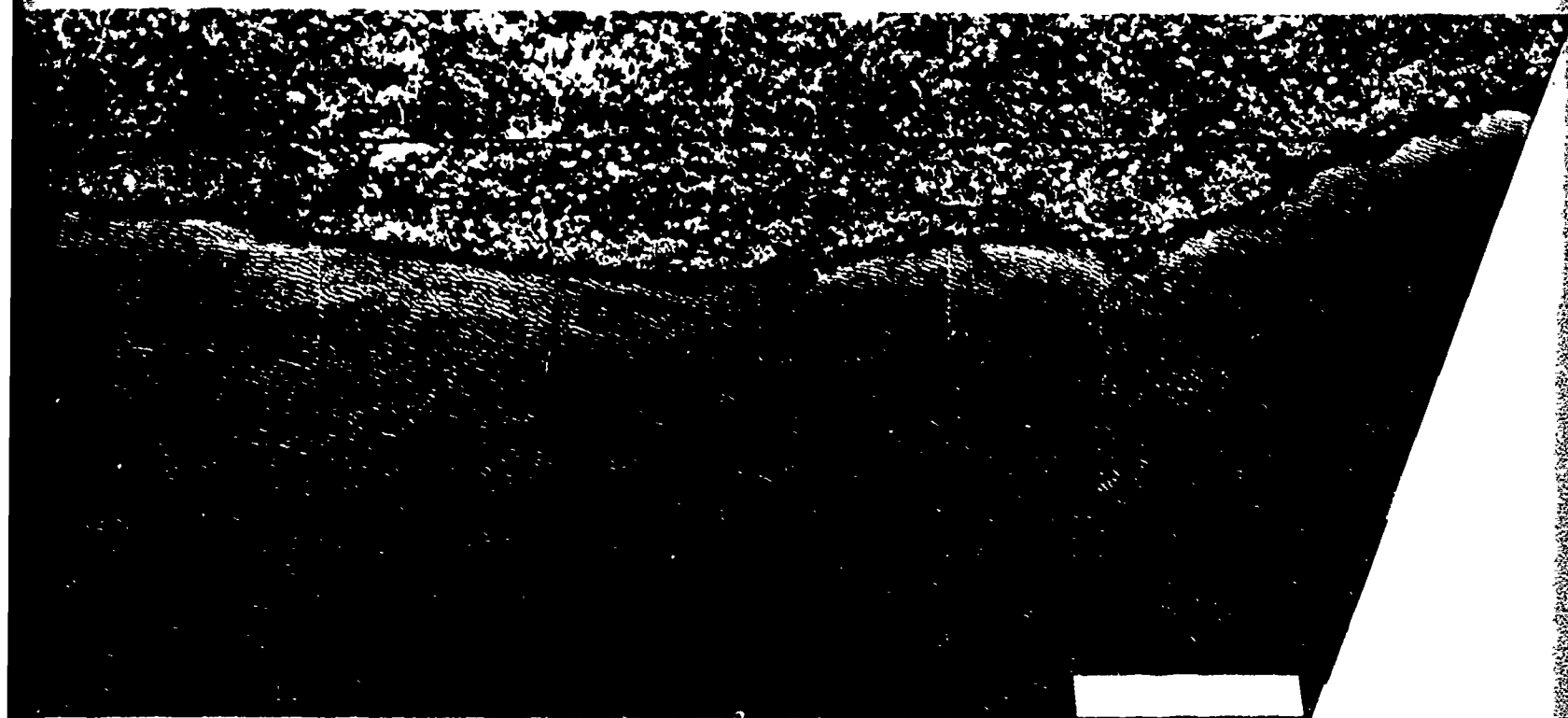
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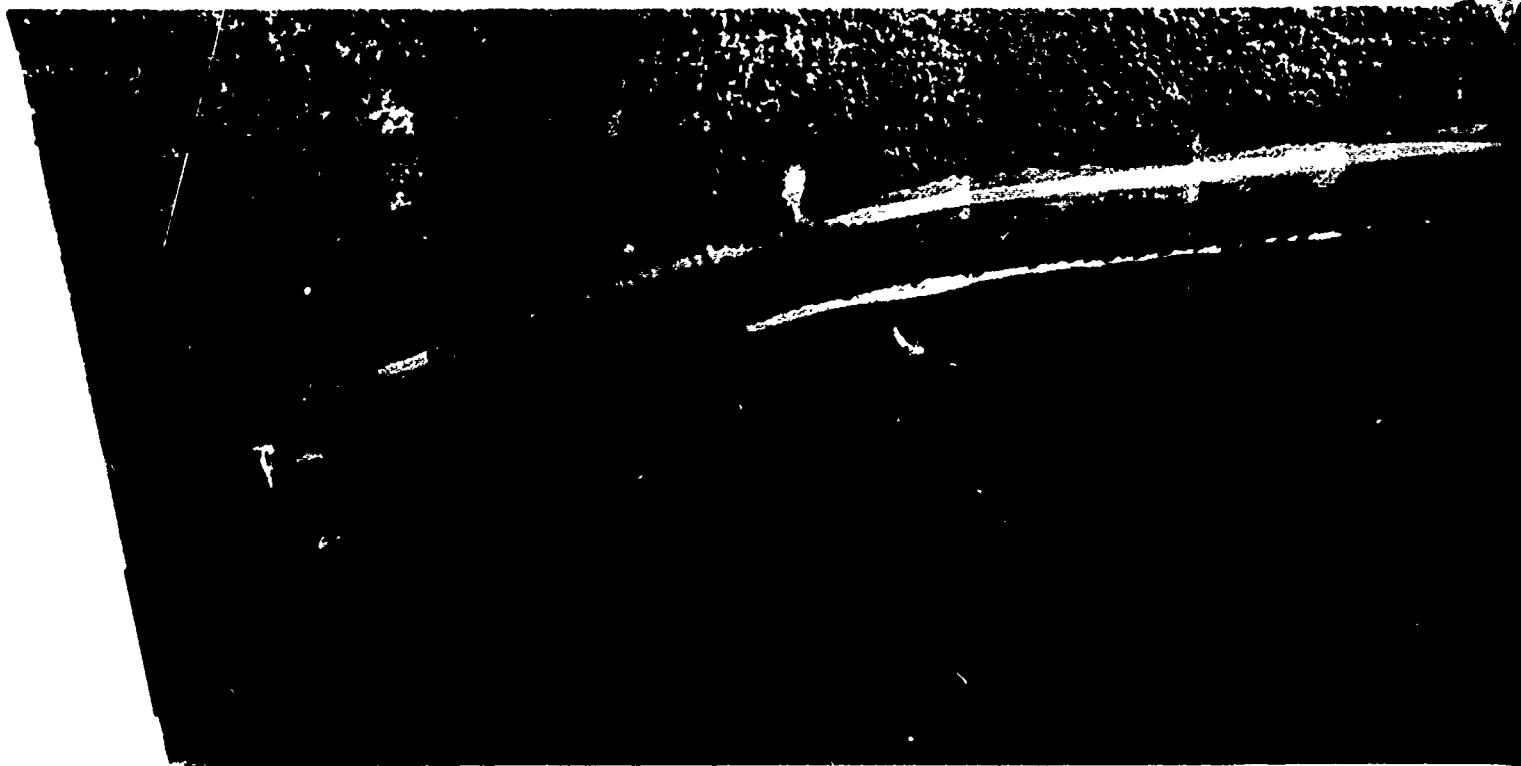


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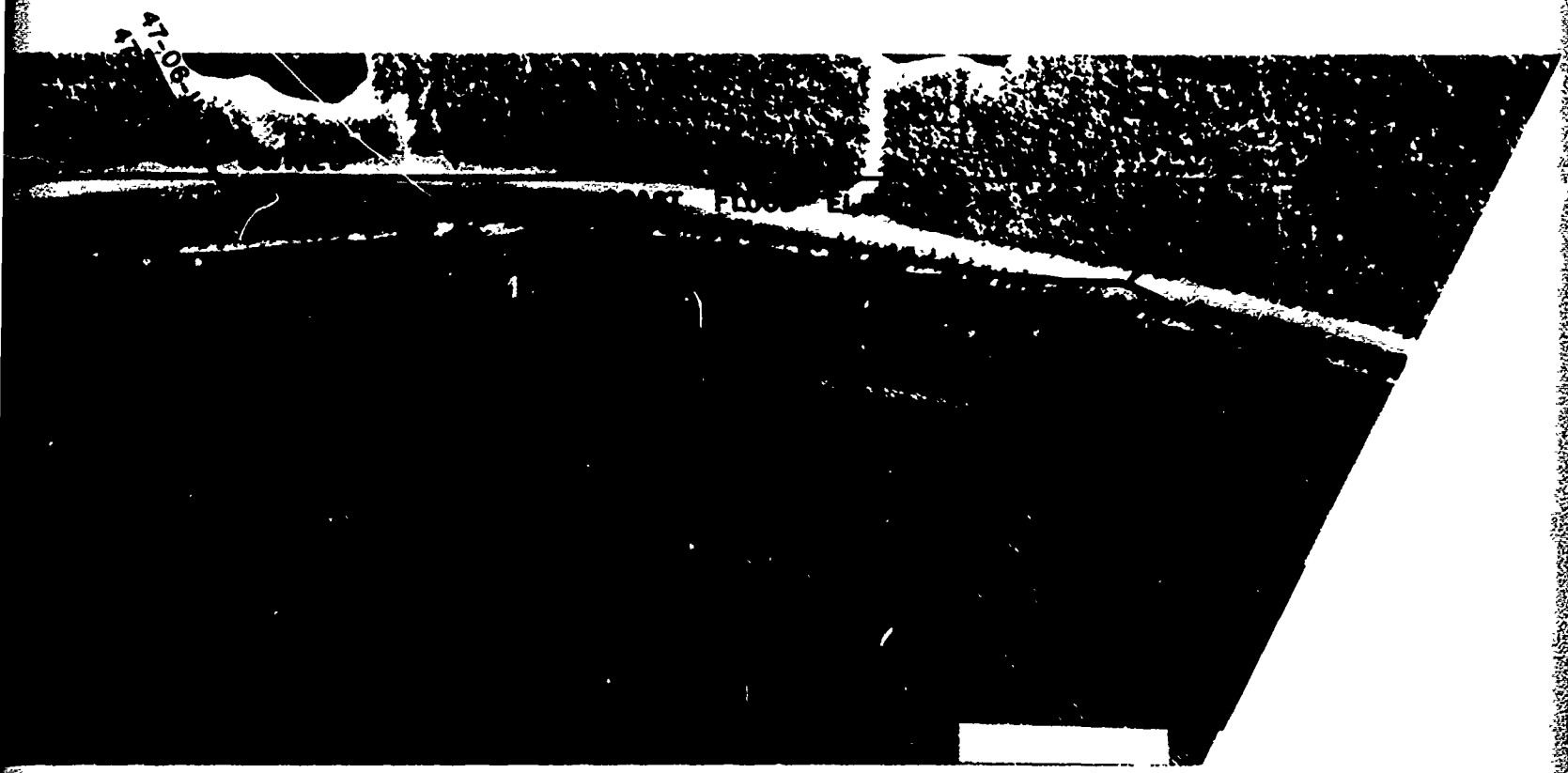


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CHIPPEWA COUNTY
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CHIPPWA COUNTY, MICHIGAN REACH #4

Variable	No. of Responses	Mean	Standard Error of Mean	Range		Adjusted Expanded Total for All Property Listings
				Minimum	Maximum	
Assessed Value (\$)	43	4600	500	400	23000	
Reported Market Value (\$)	23	11200	2100	700	40000	
Bluff Height (Ft.)	29	7	1	3	15	
Beach Depth (Ft.)	23	11	1	4	25	
Bluff Lost (Ft.)	27	11	2	1	30	
Beach Lost (Ft.)	27	19	2	3	35	
Damages Erosion (\$)	12	3050	850	500	10000	
Damages Flooding (\$)	5	1110	350	300	2000	
Damages - Erosion and Flooding (\$)						59,000
Protective Structure Cost (\$)	6	1250	400	125	3000	11,000
Total Damages (\$)	17	2960	800	300	13000	70,000

Total Identified Residential Properties: 62 Self-Administered Assessment Respondents: 43



CHIPPEWA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 25
SCALE: 1" = 500'
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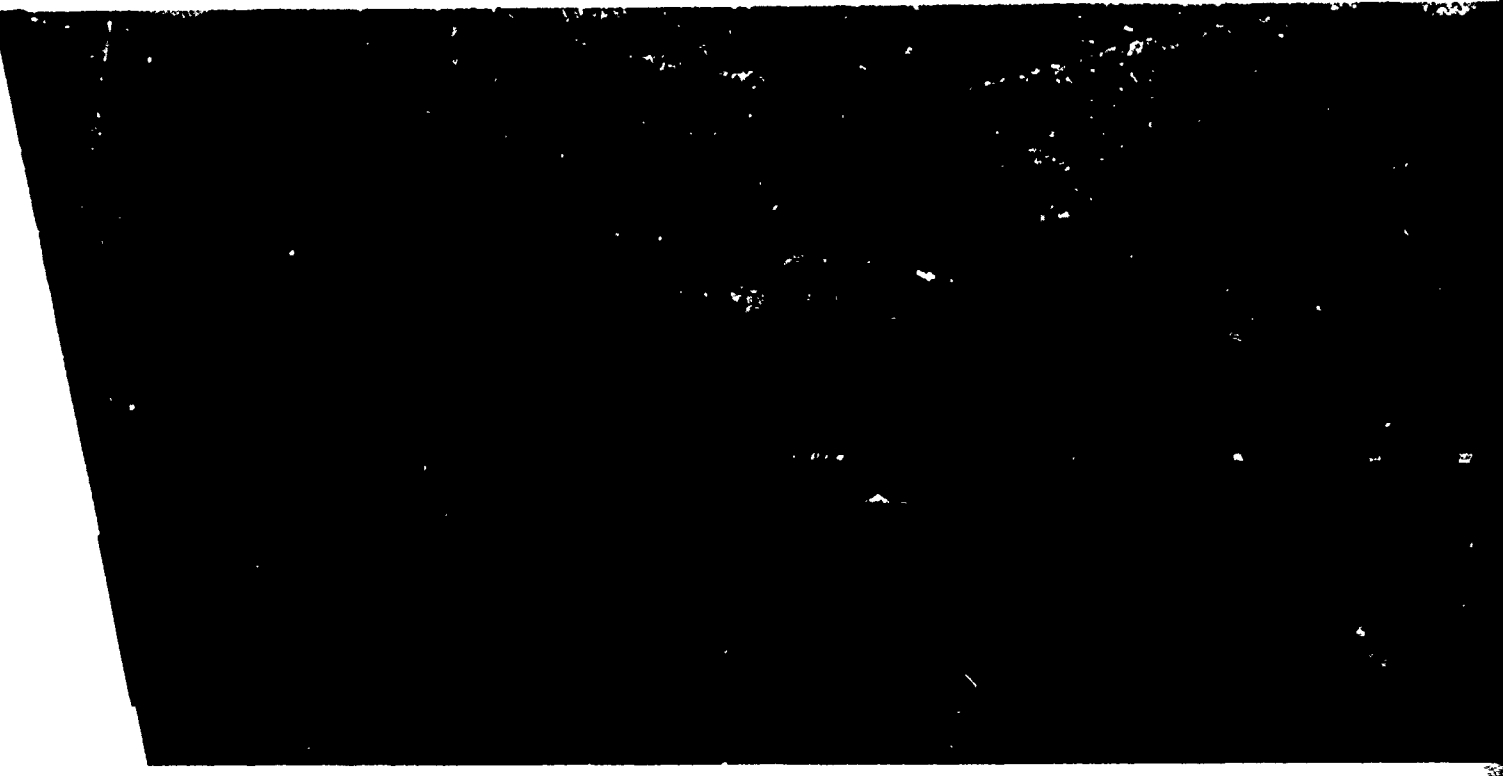
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AUNEE POINT

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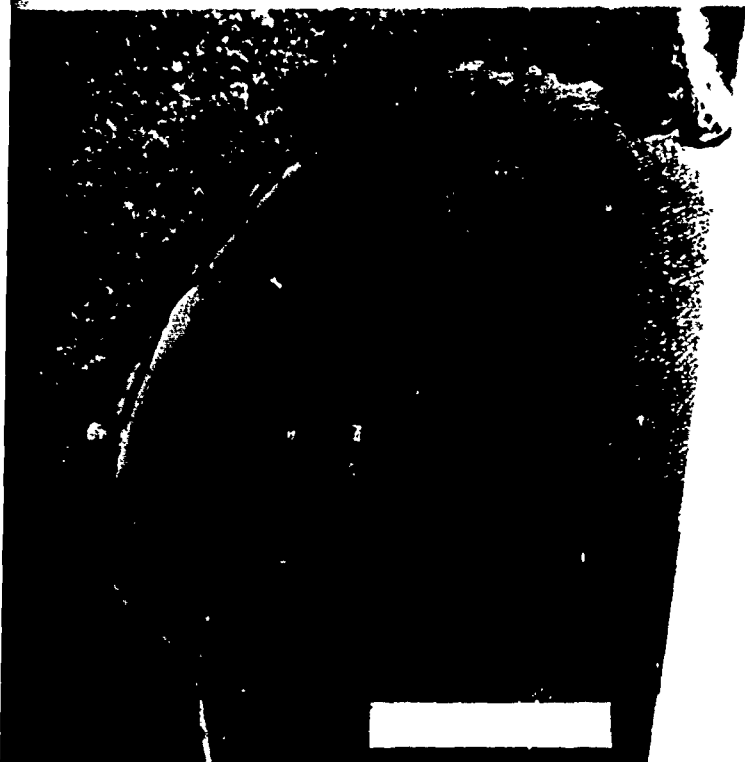


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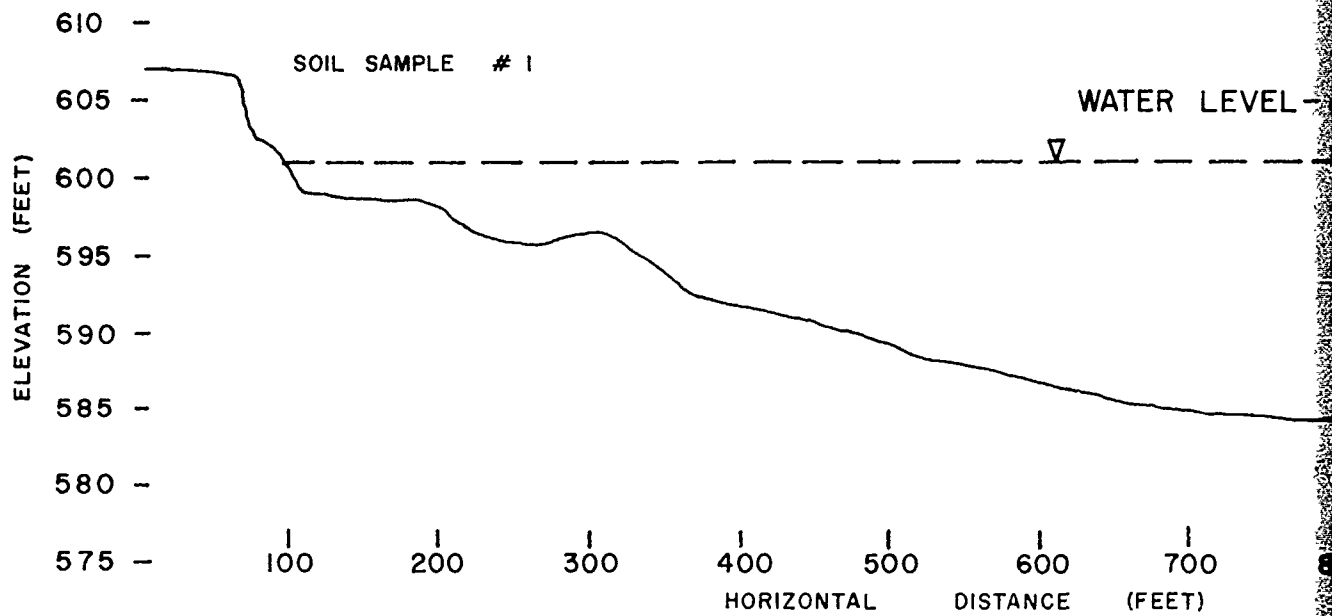
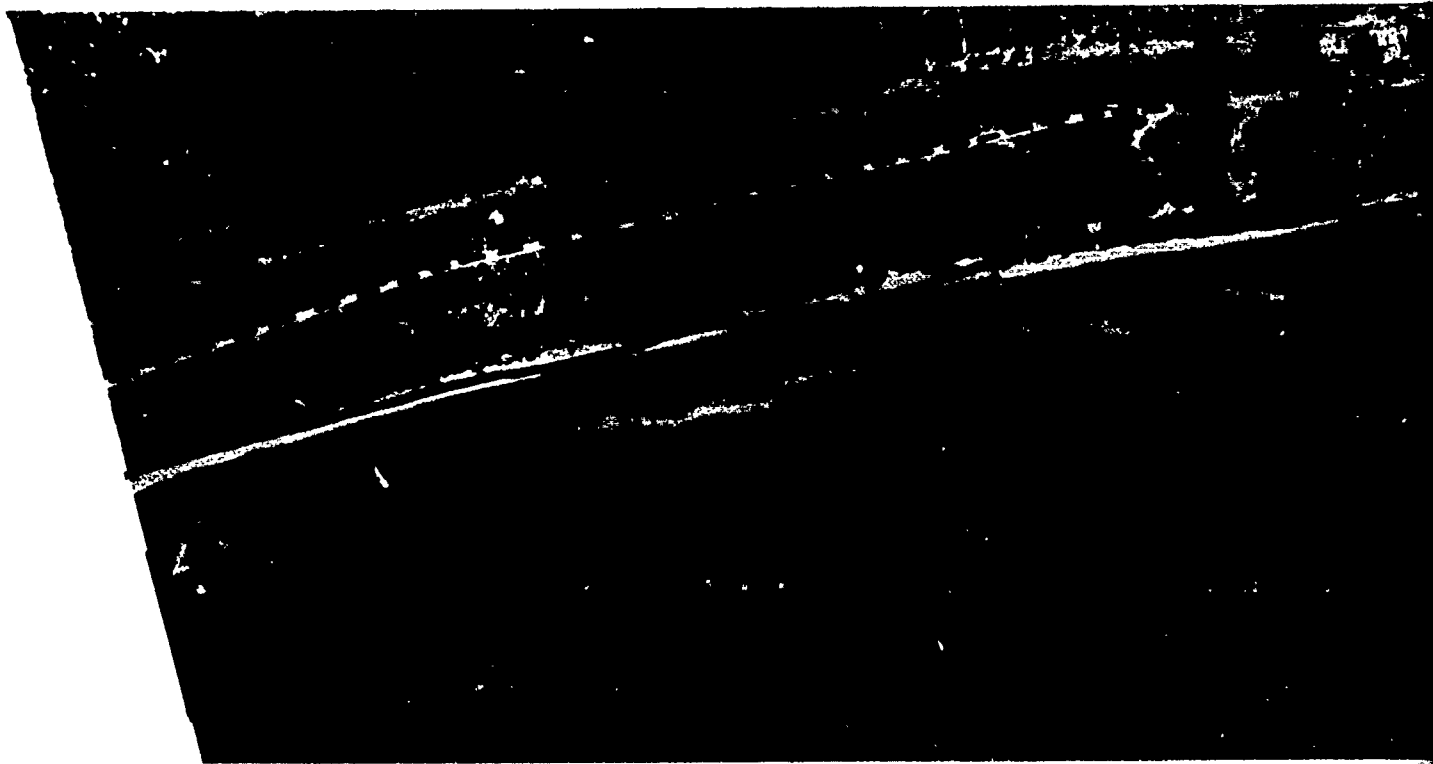


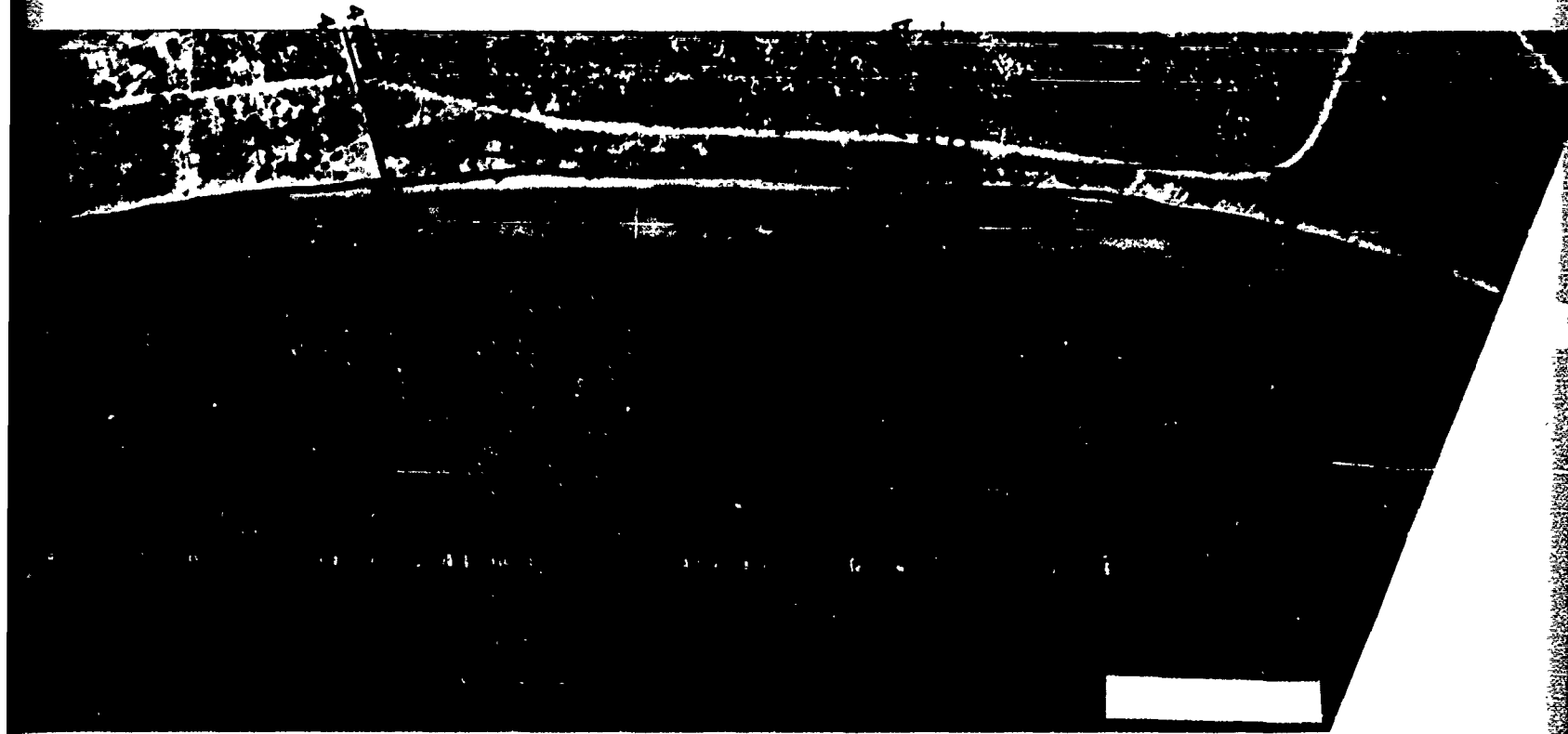
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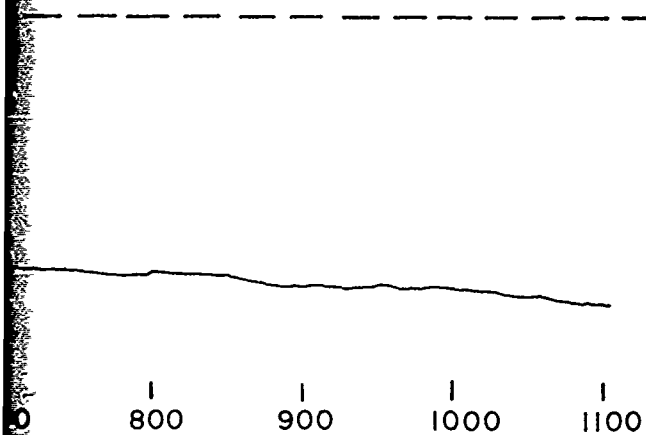
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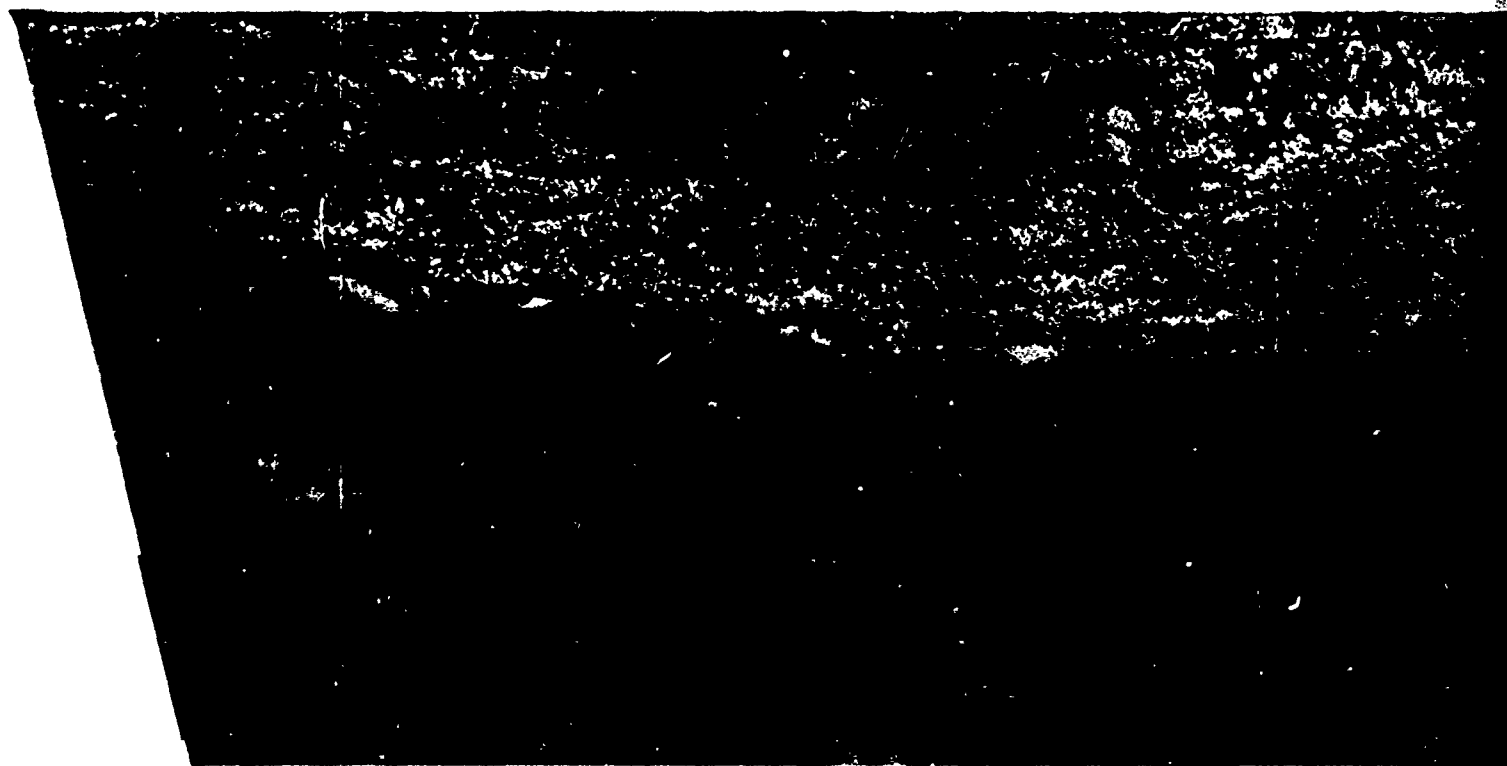


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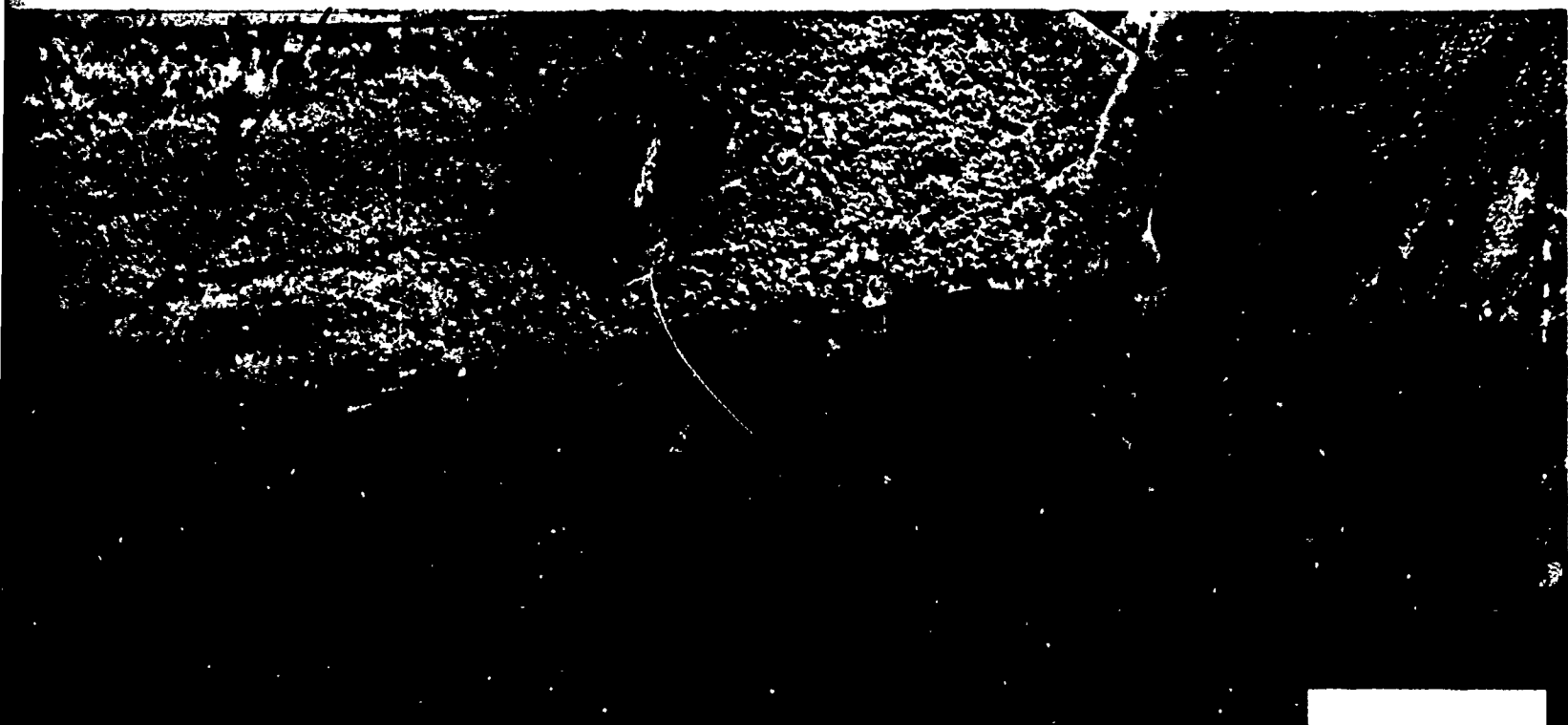


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PILOT DAMAGE STUDY, 1975
PLATE NO. 29
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN

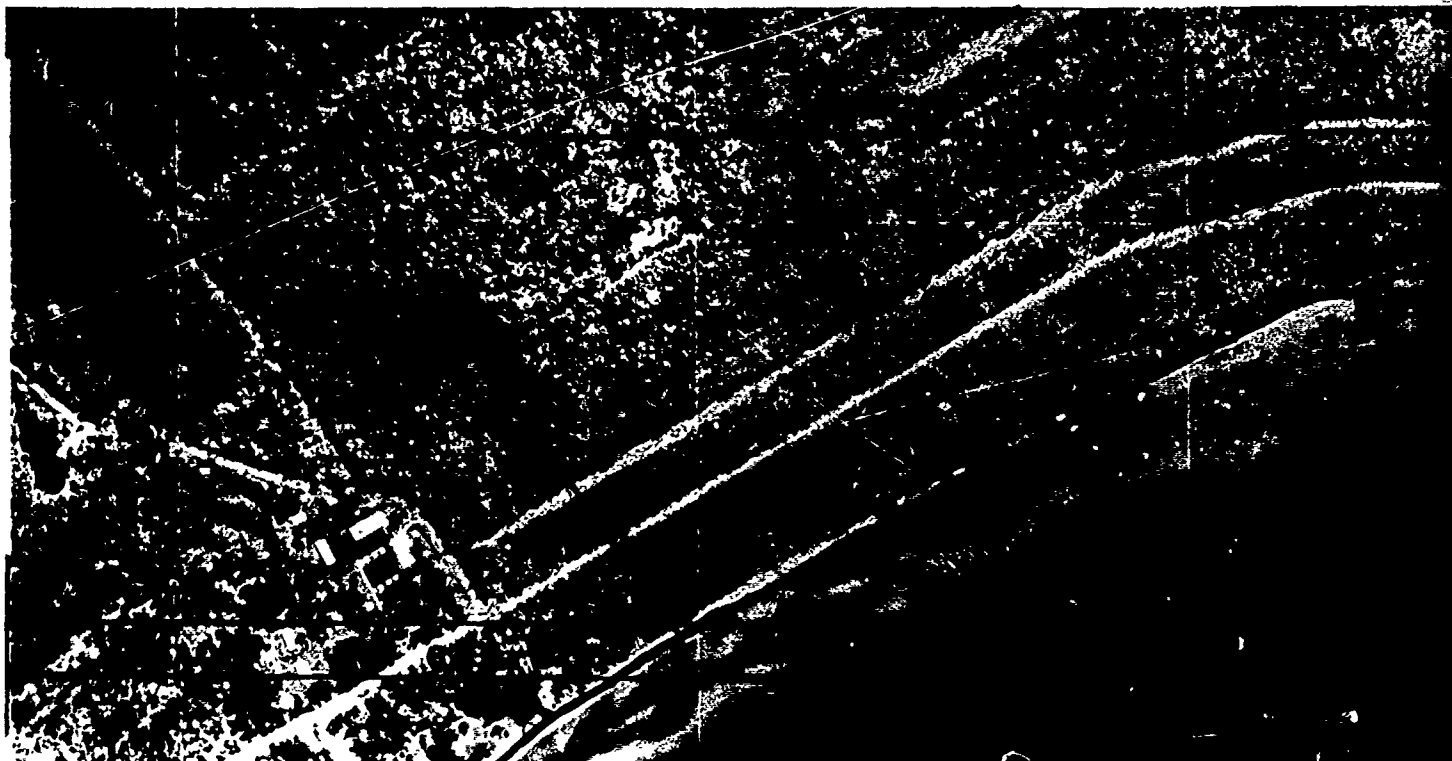
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Reach 5 is Hiawatha National Forest - No Residential Data



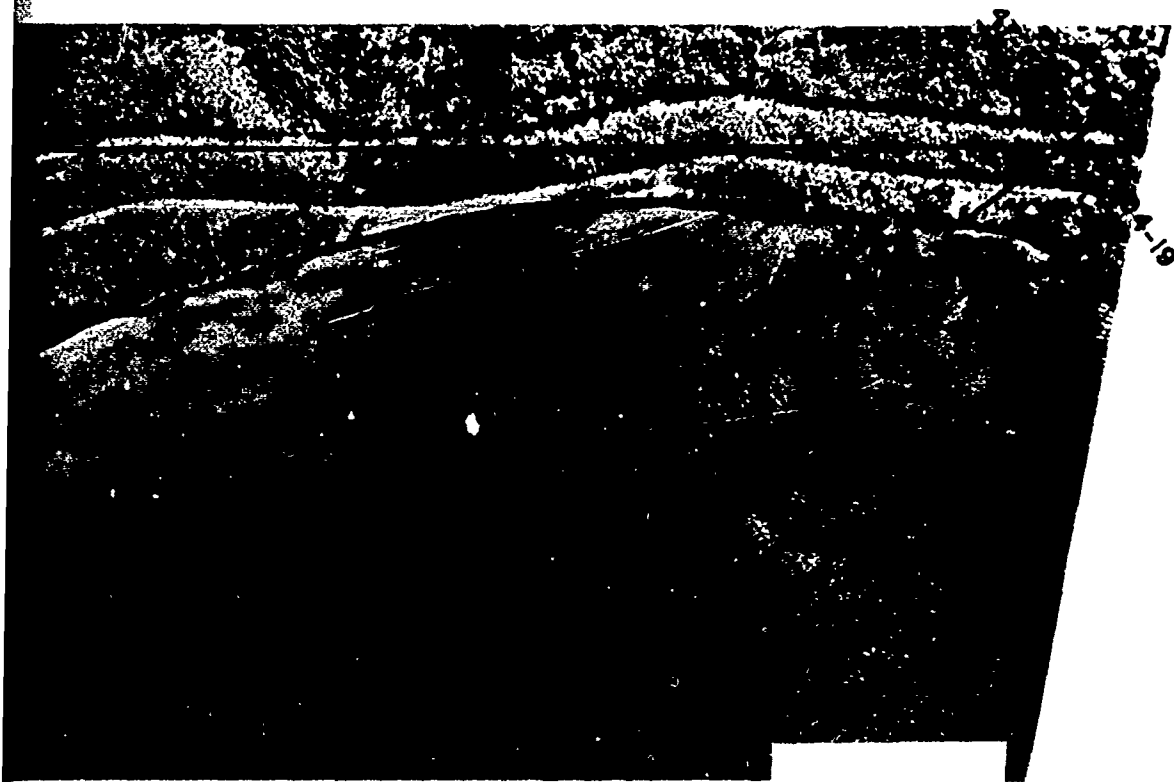
CHIPPEWA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 30
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN



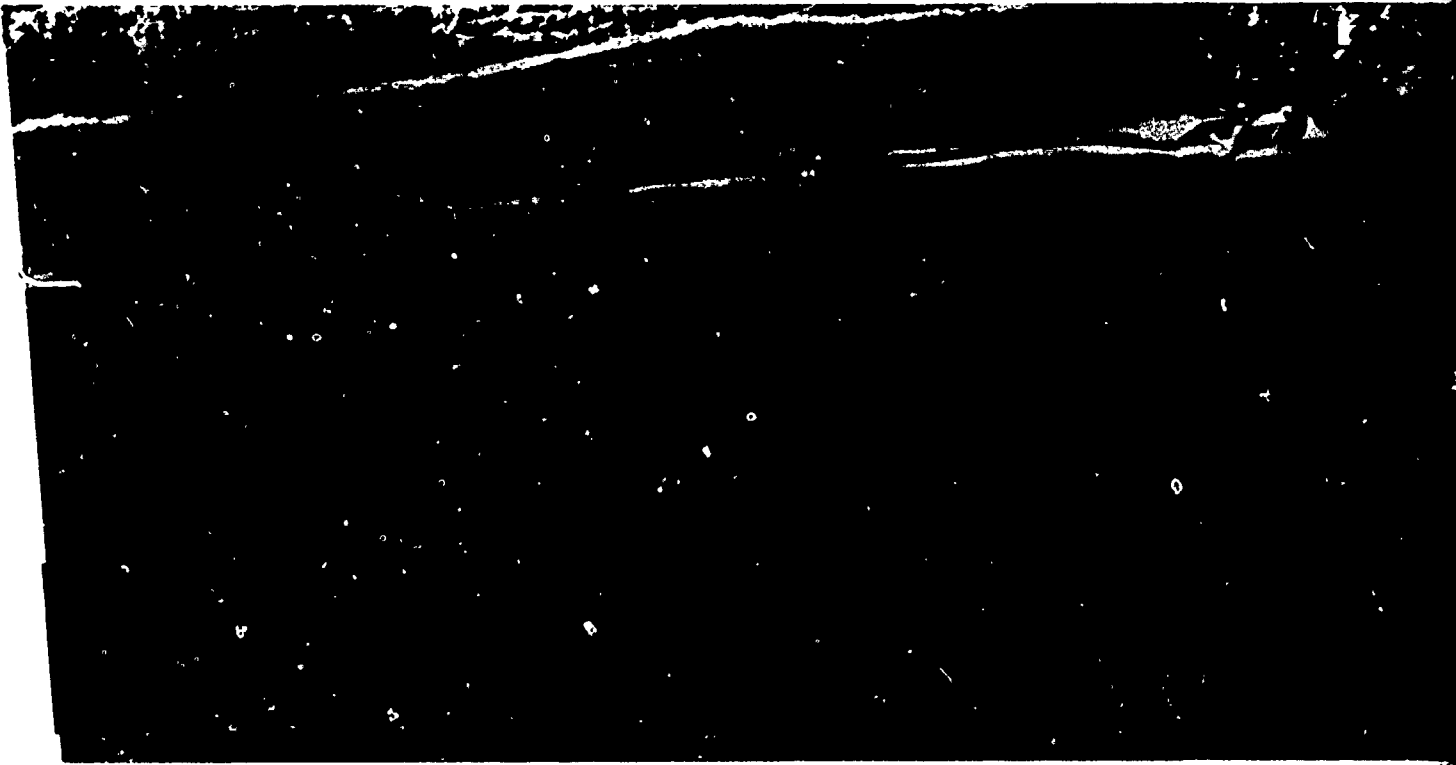
CHIPPEWA COUNTY, MICHIGAN REACH #6

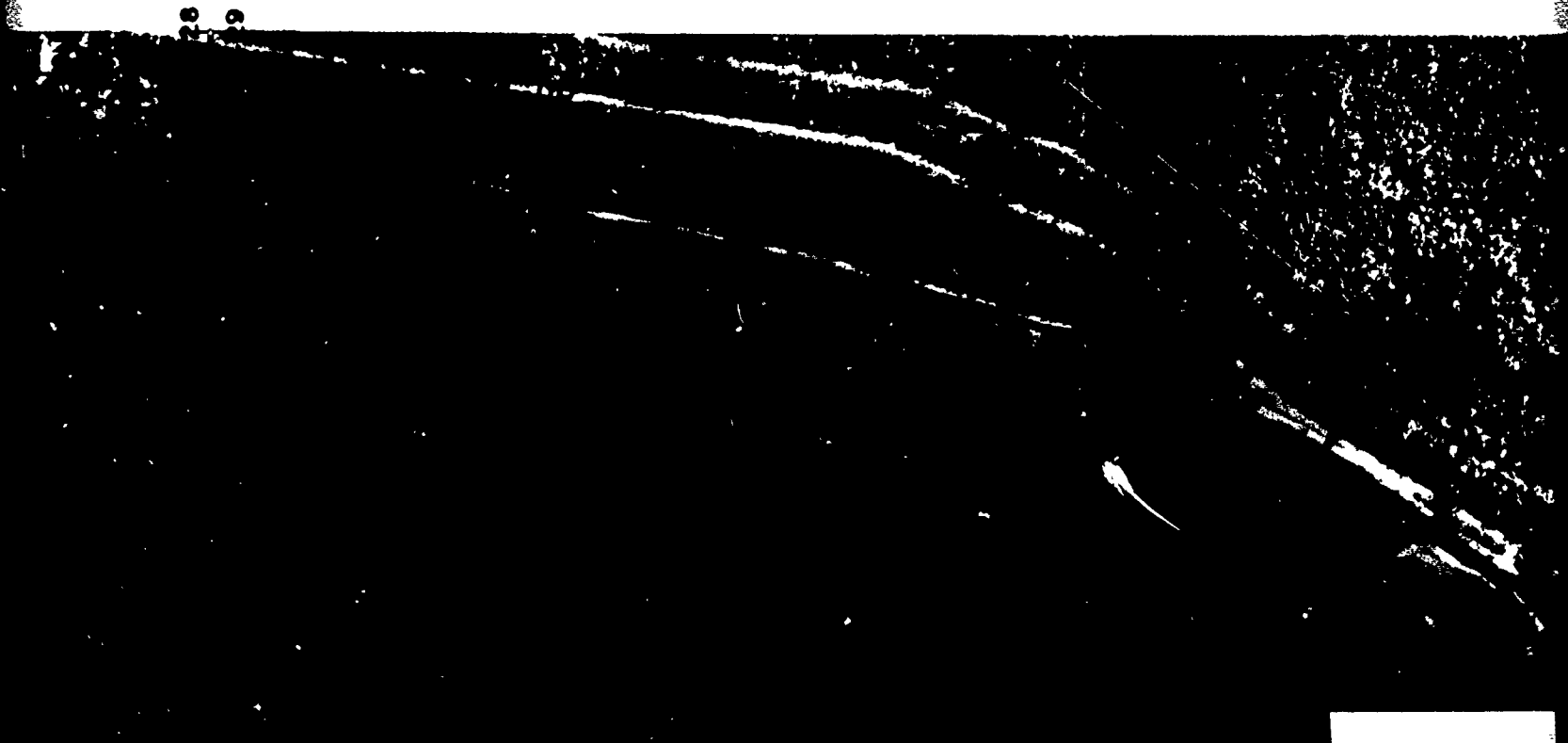
Variable	No. of Responses	Mean	Standard Error of Mean	Range		Adjusted Expanded Total for All Property Listings
				Minimum	Maximum	
Assessed Value (\$)	311	5400	300	400	63000	.
Reported Market Value (\$)	194	19300	1400	600	225000	
Bluff Height (Ft.)	205	10	1	1	40	
Beach Depth (Ft.)	164	17	1	1	80	
Bluff Lost (Ft.)	155	9	1	1	40	
Beach Lost (Ft.)	178	16	1	2	200	
Damages Erosion (\$)	109	2650	400	50	31000	
Damages Flooding (\$)	70	2050	500	50	30000	
Damages - Erosion and Flooding (\$)						553,000
Protective Structure Cost (\$)	96	1100	150	50	6950	134,000
Total Damages (\$)	69	3150	450	50	64000	687,000

Total Identified Residential Properties: 400 Self-Administered Assessment Respondents: 306



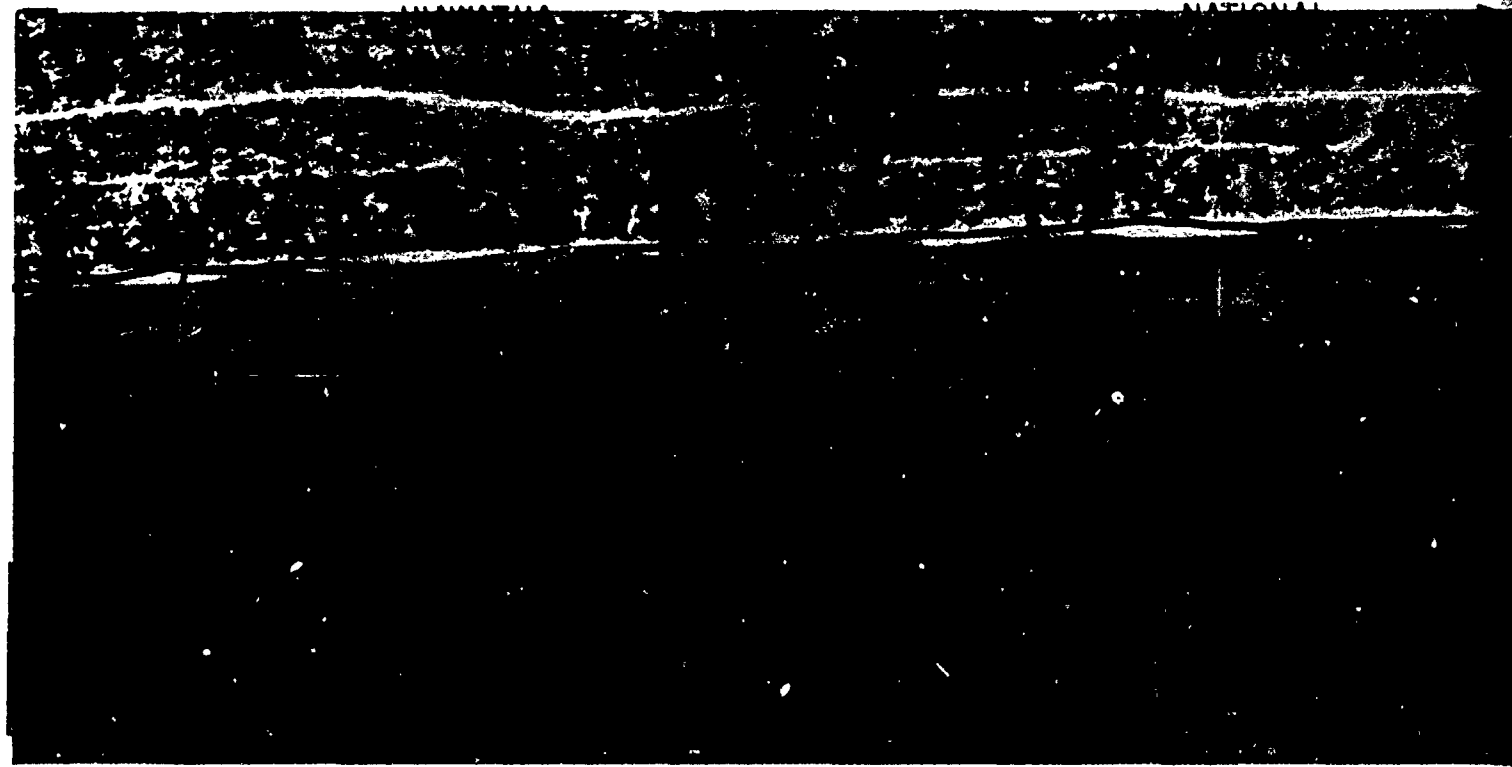
CHIPPEWA COUNTY
PILOT DAMACE STUDY, 1975
PLATE NO. 31
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN





CHIPPEWA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 32
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN

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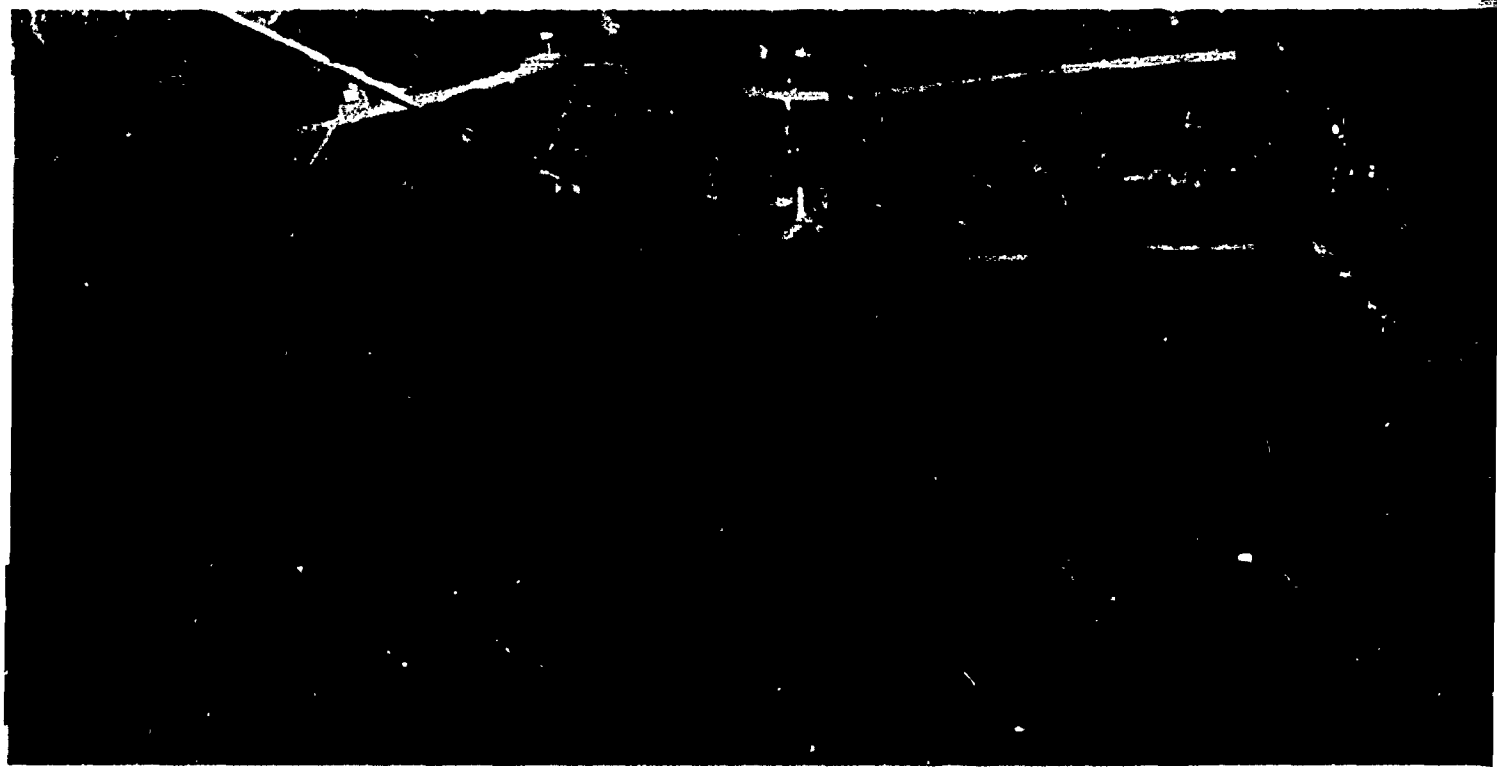


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CHIPPEWA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 33
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN

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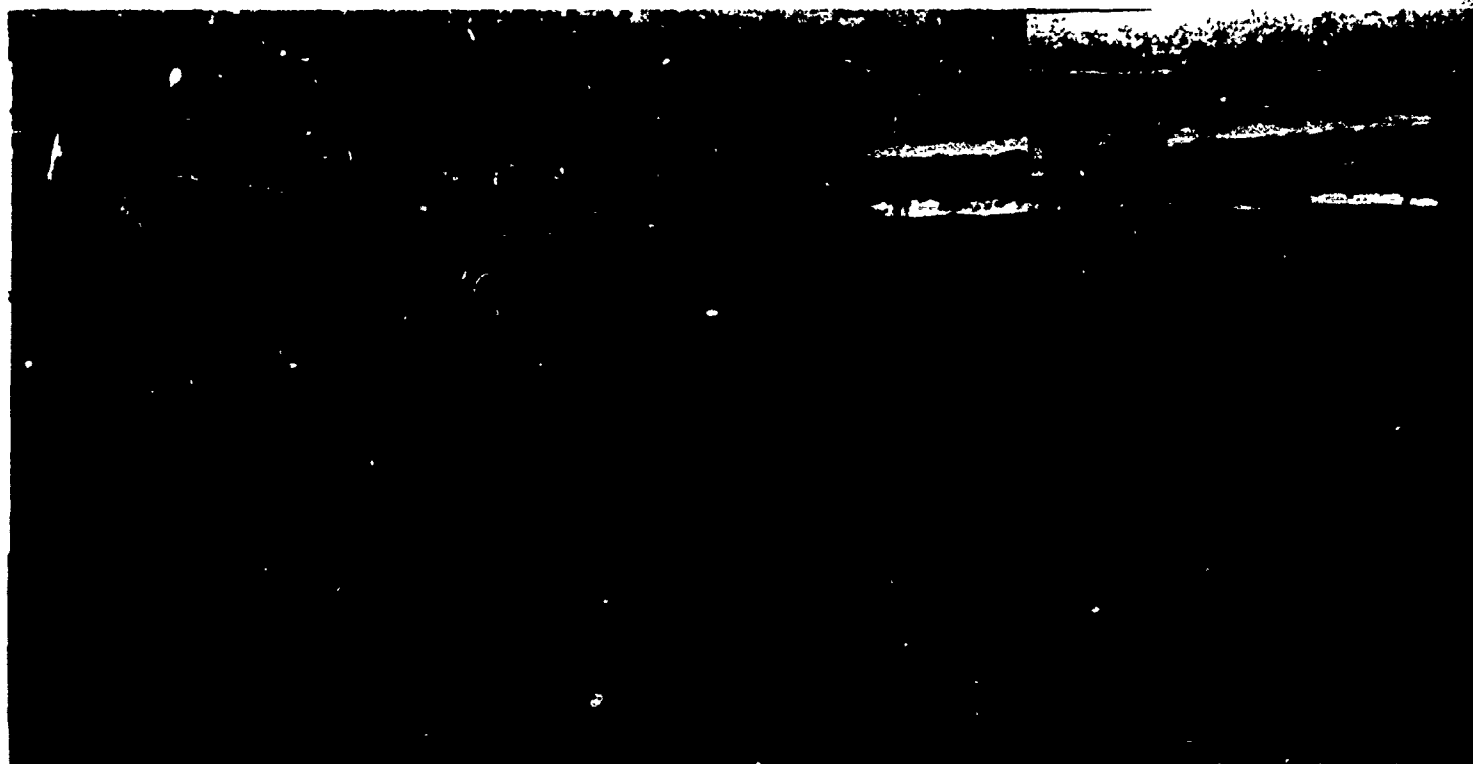
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CHIPPEWA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 34
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN

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CHIPPEWA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 35
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN

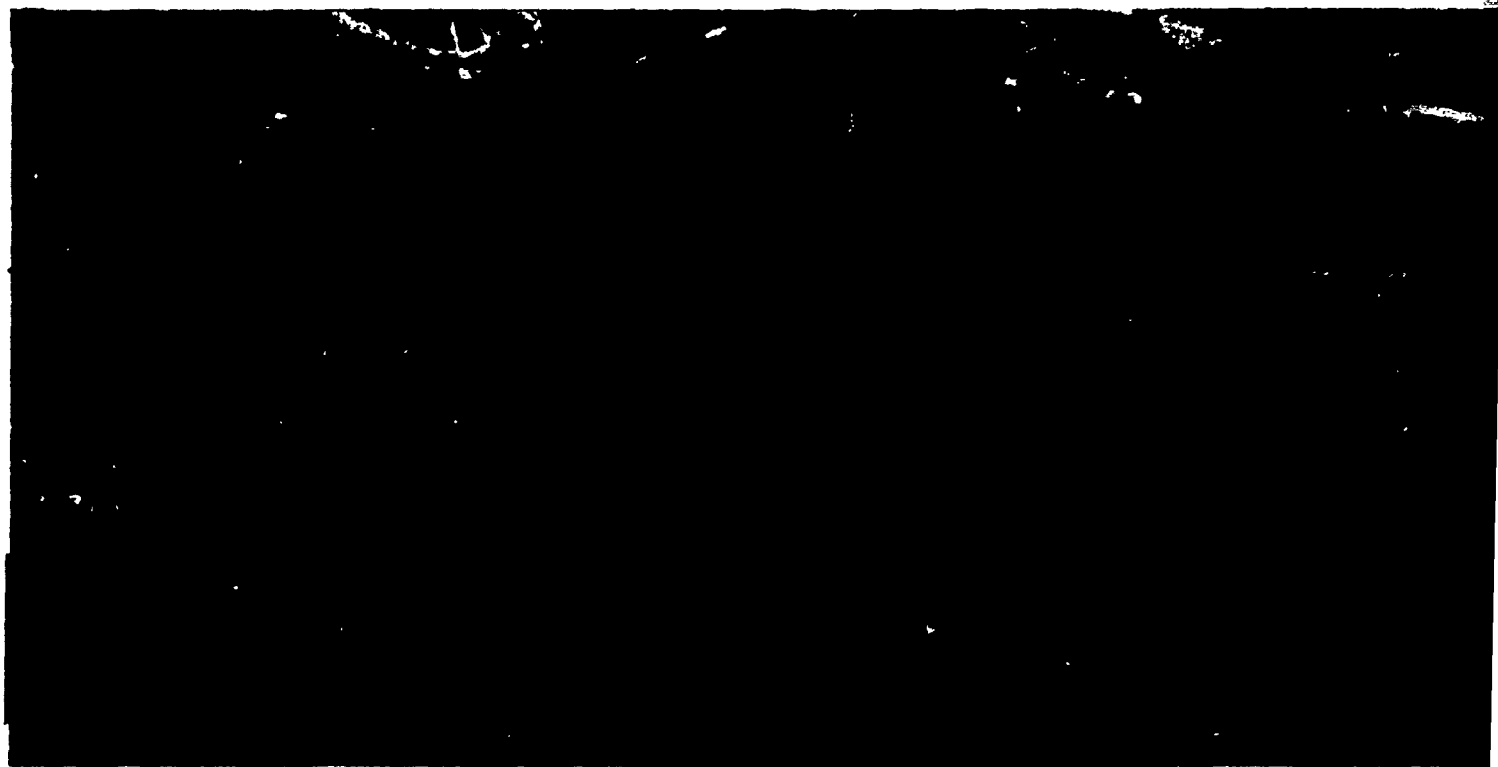
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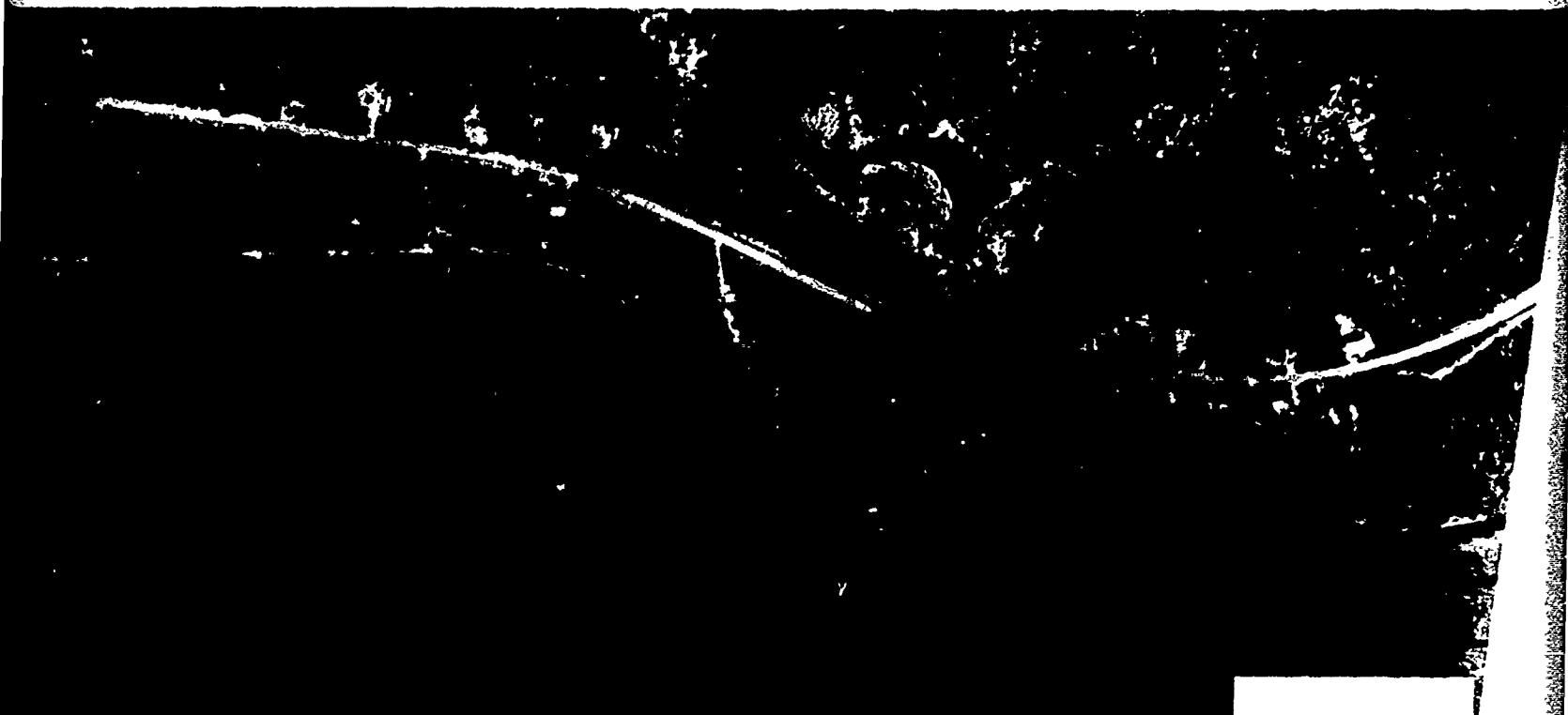
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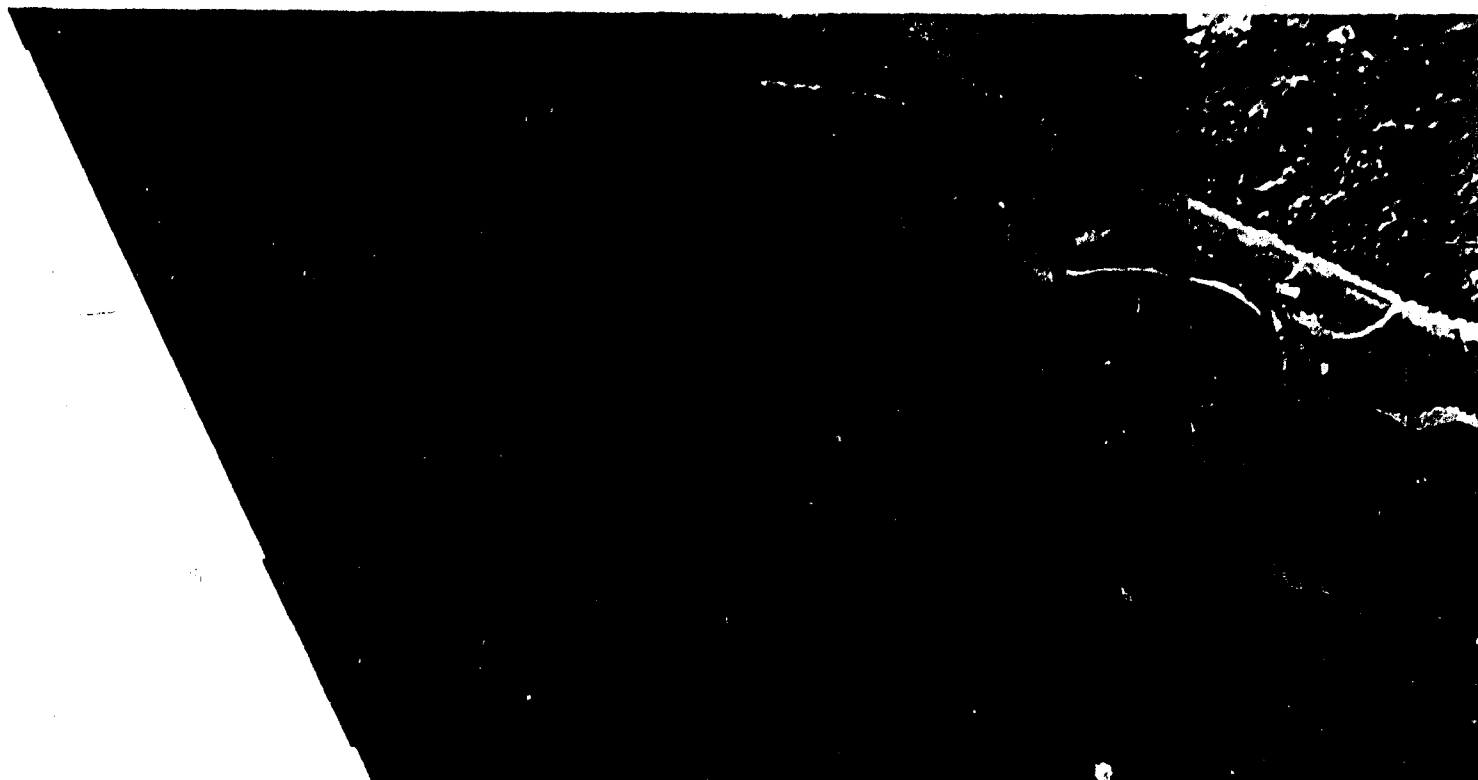
CHIPPEWA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 36
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN

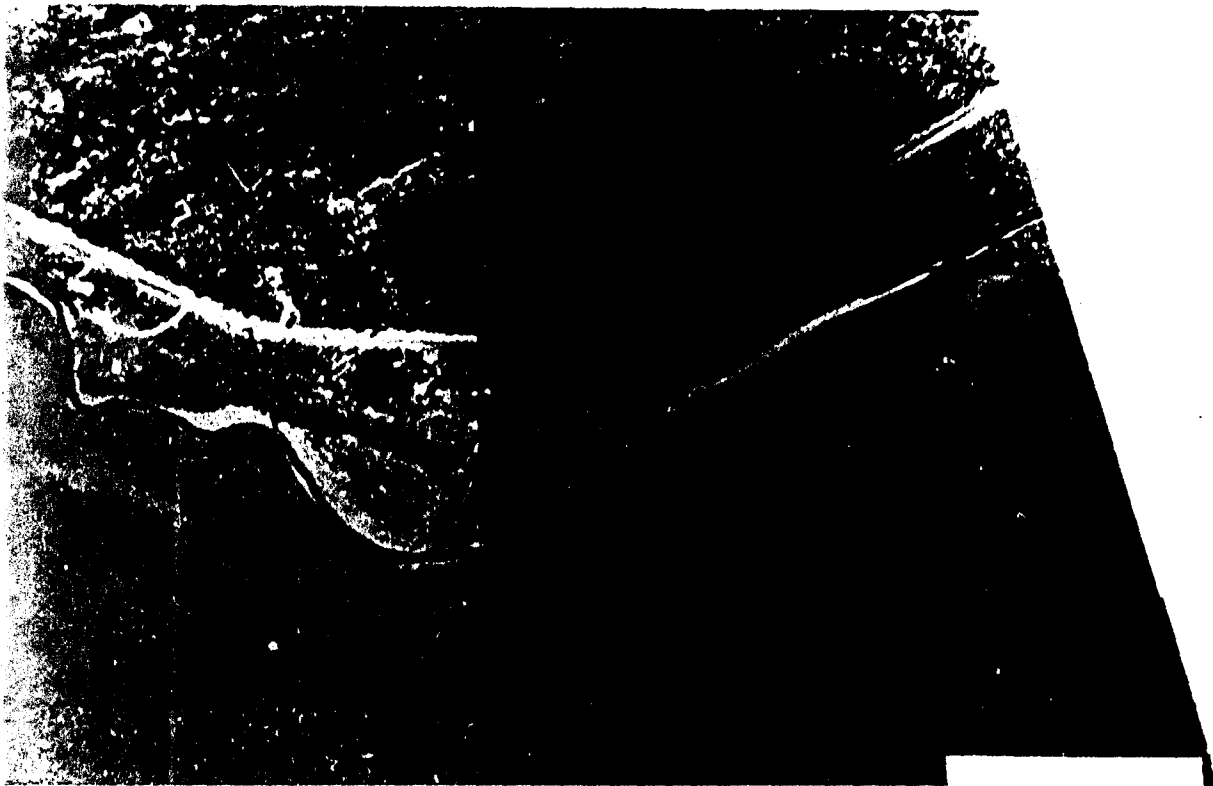


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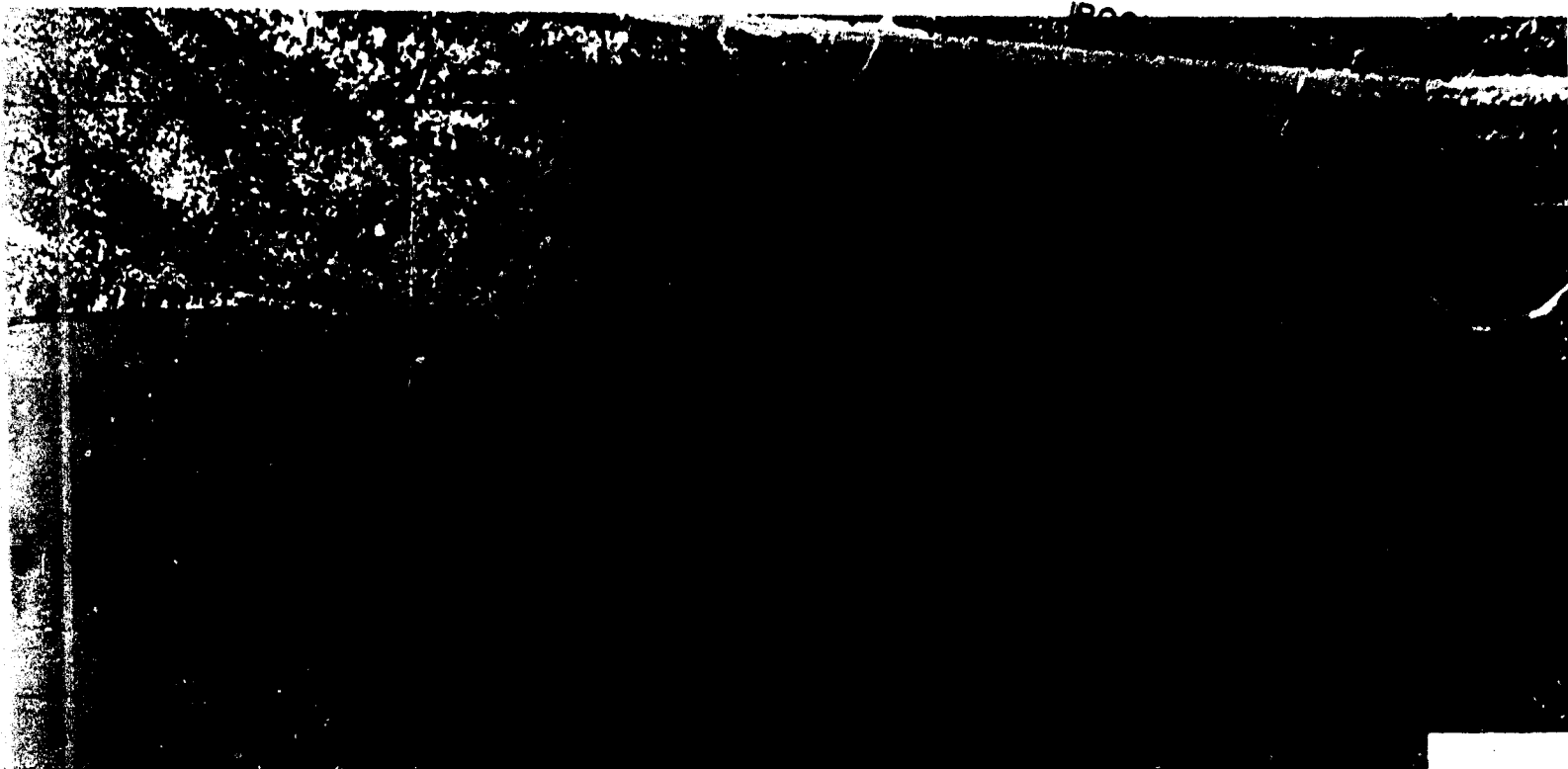
CHIPPEWA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 37
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN





CHIPPEWA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 38
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN





CHIPPEWA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 39
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN

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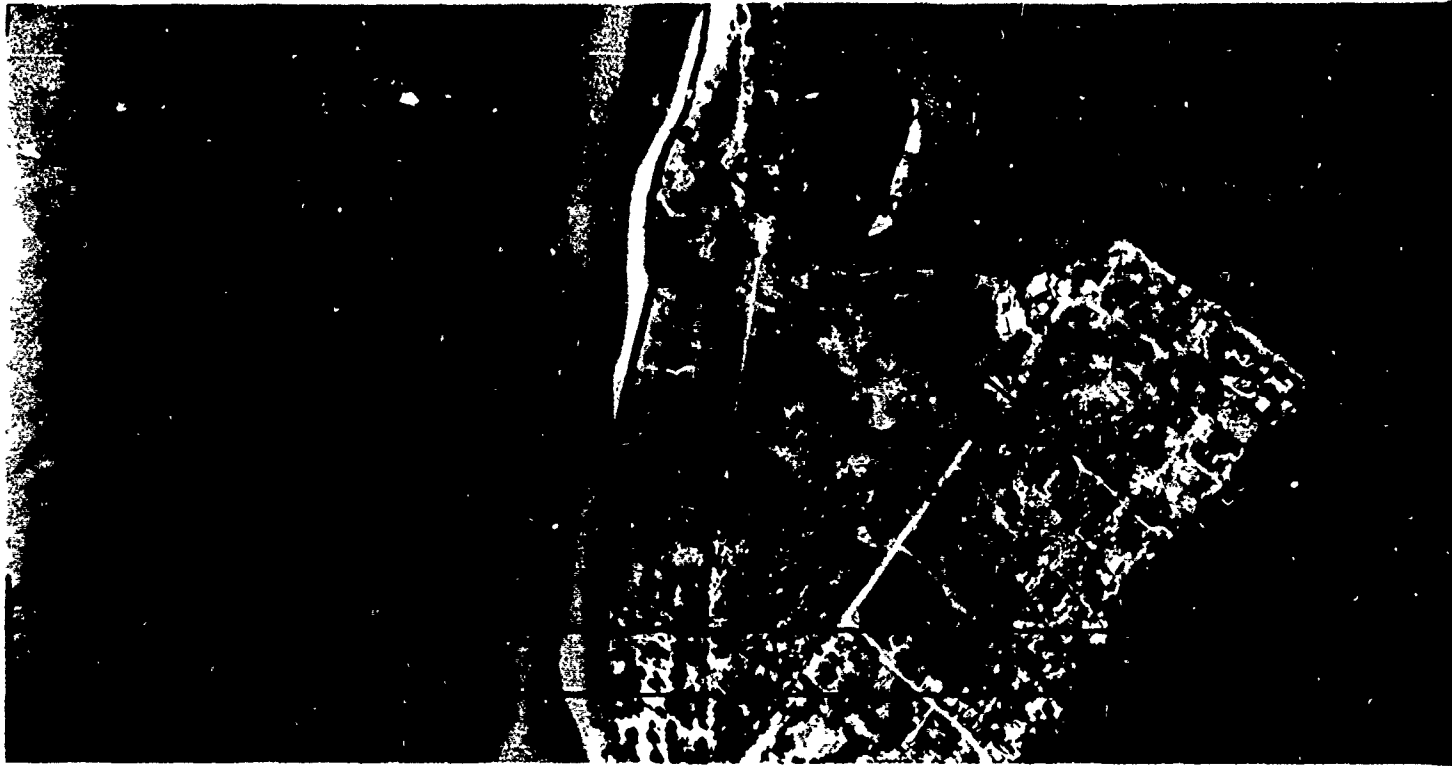
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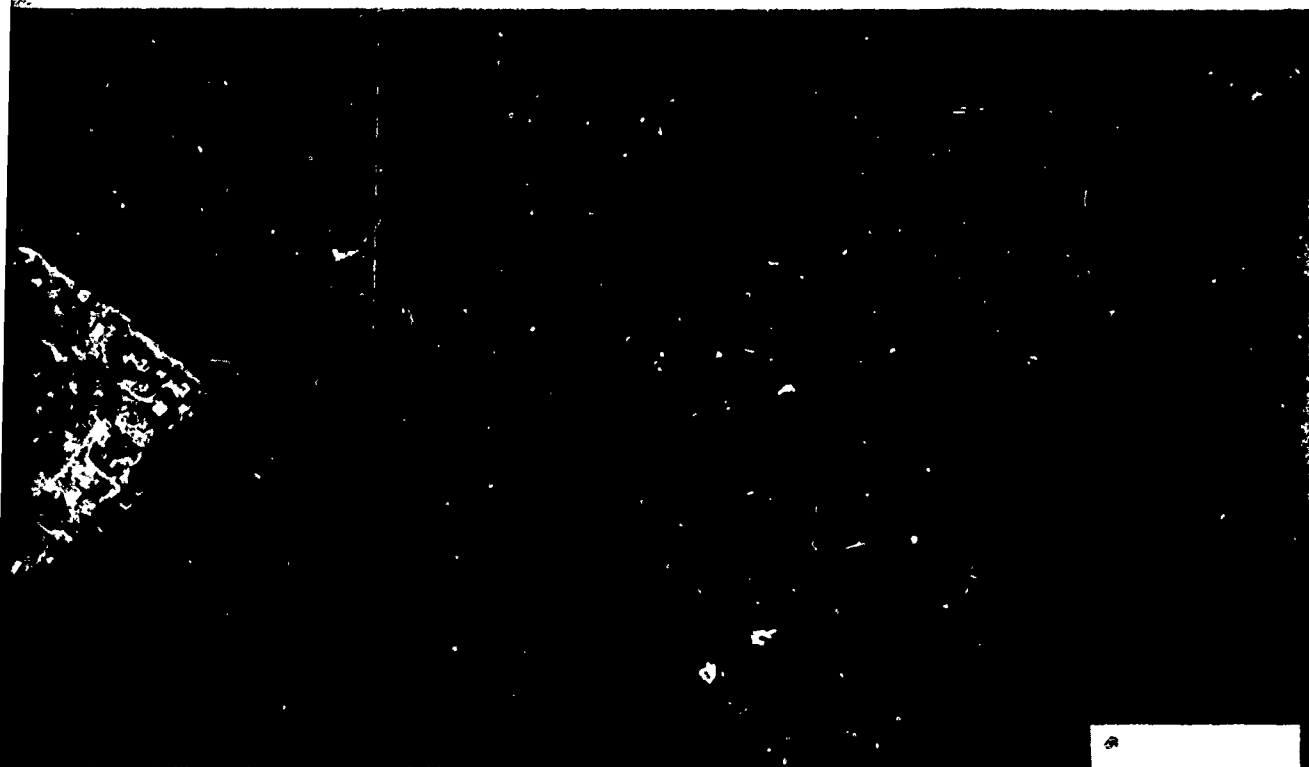
CHIPPEWA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 40
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN



CHIPPEWA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 41
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN

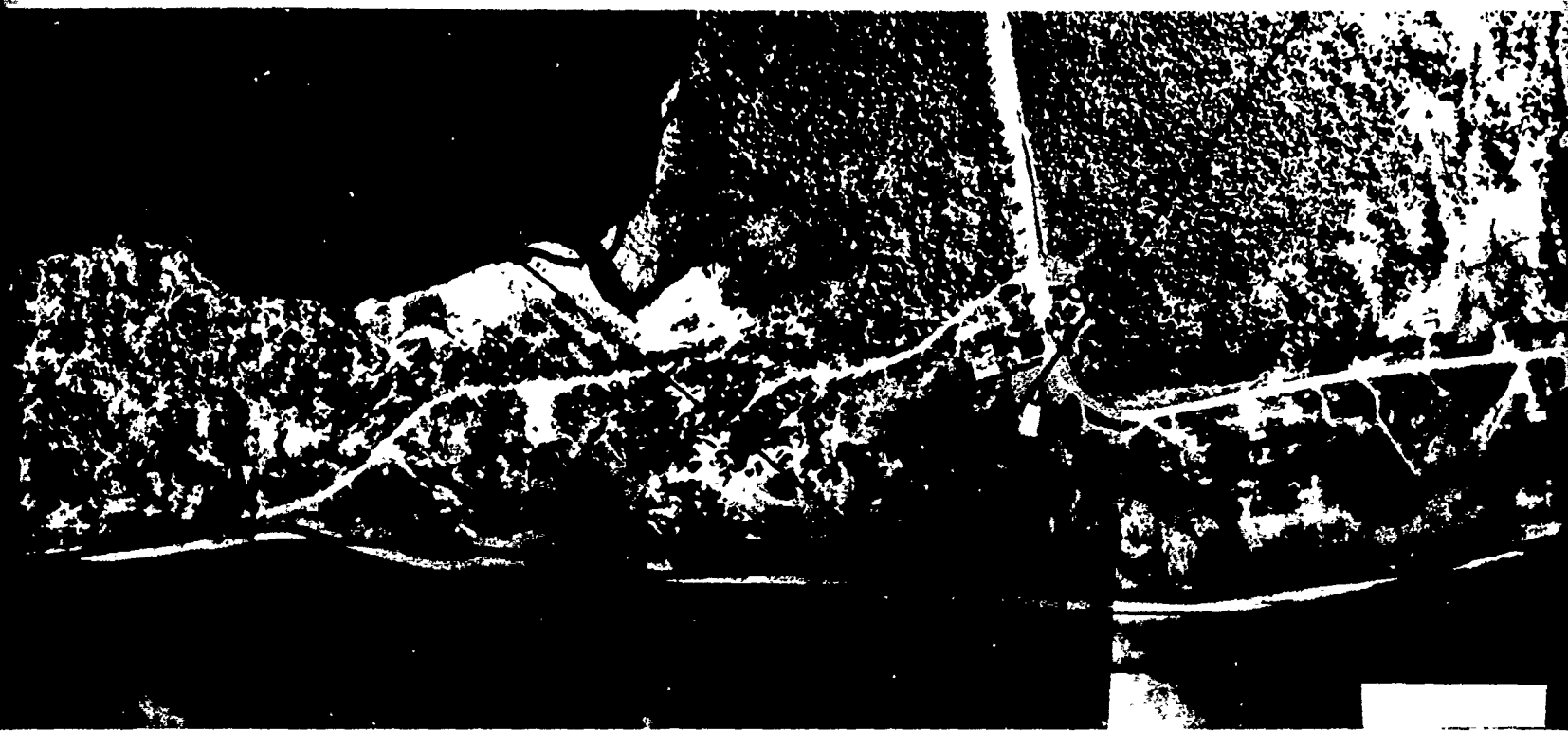


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CHIPPEWA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NC. 42
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN





CHIPPEWA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 43
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN

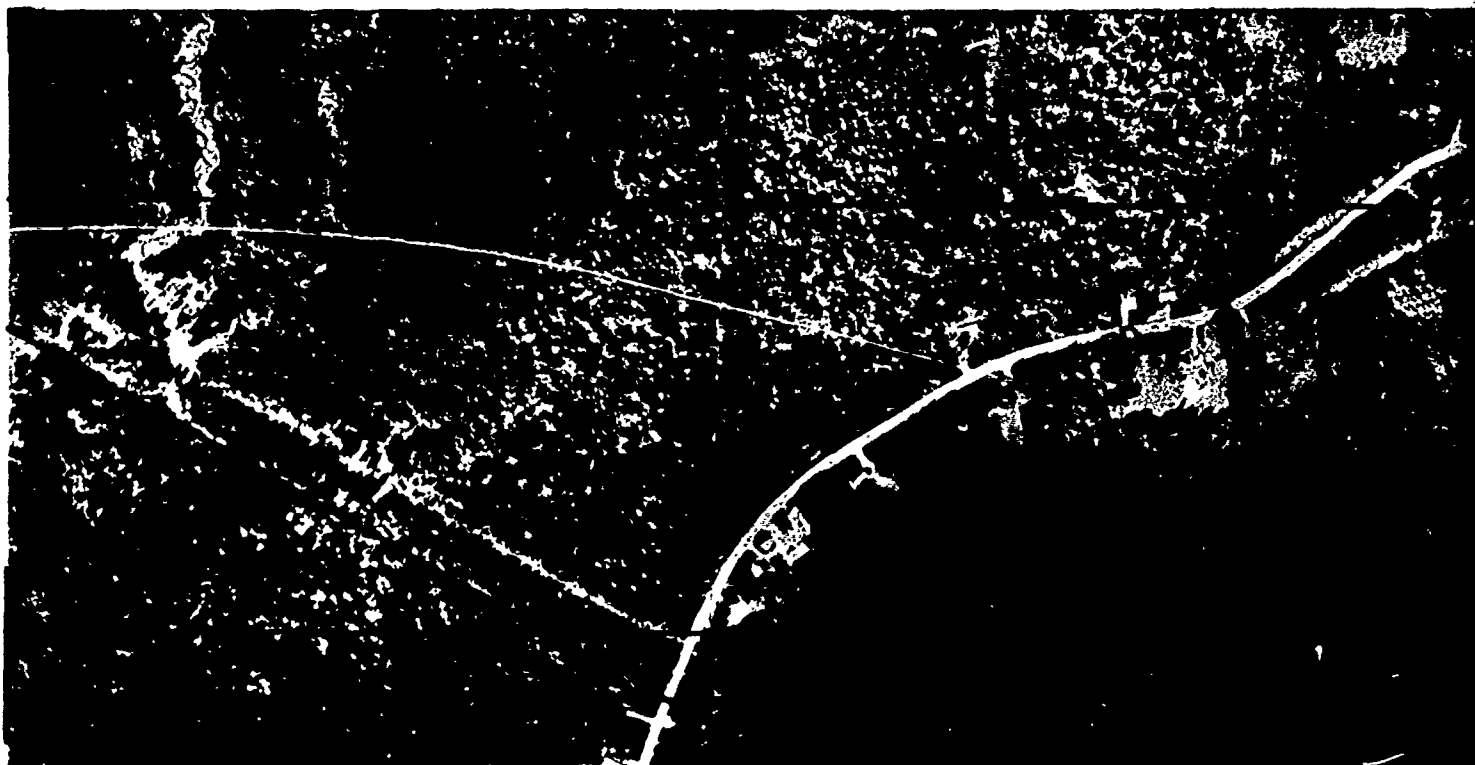
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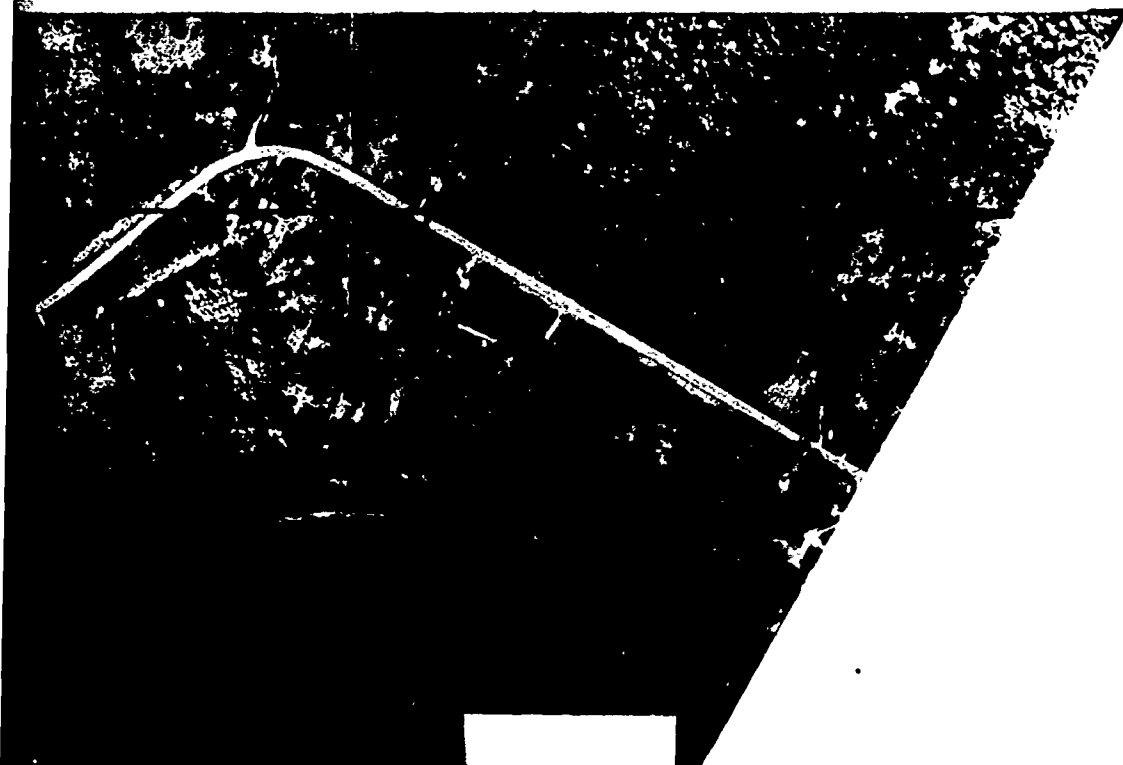


CHIPPEWA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 44
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN

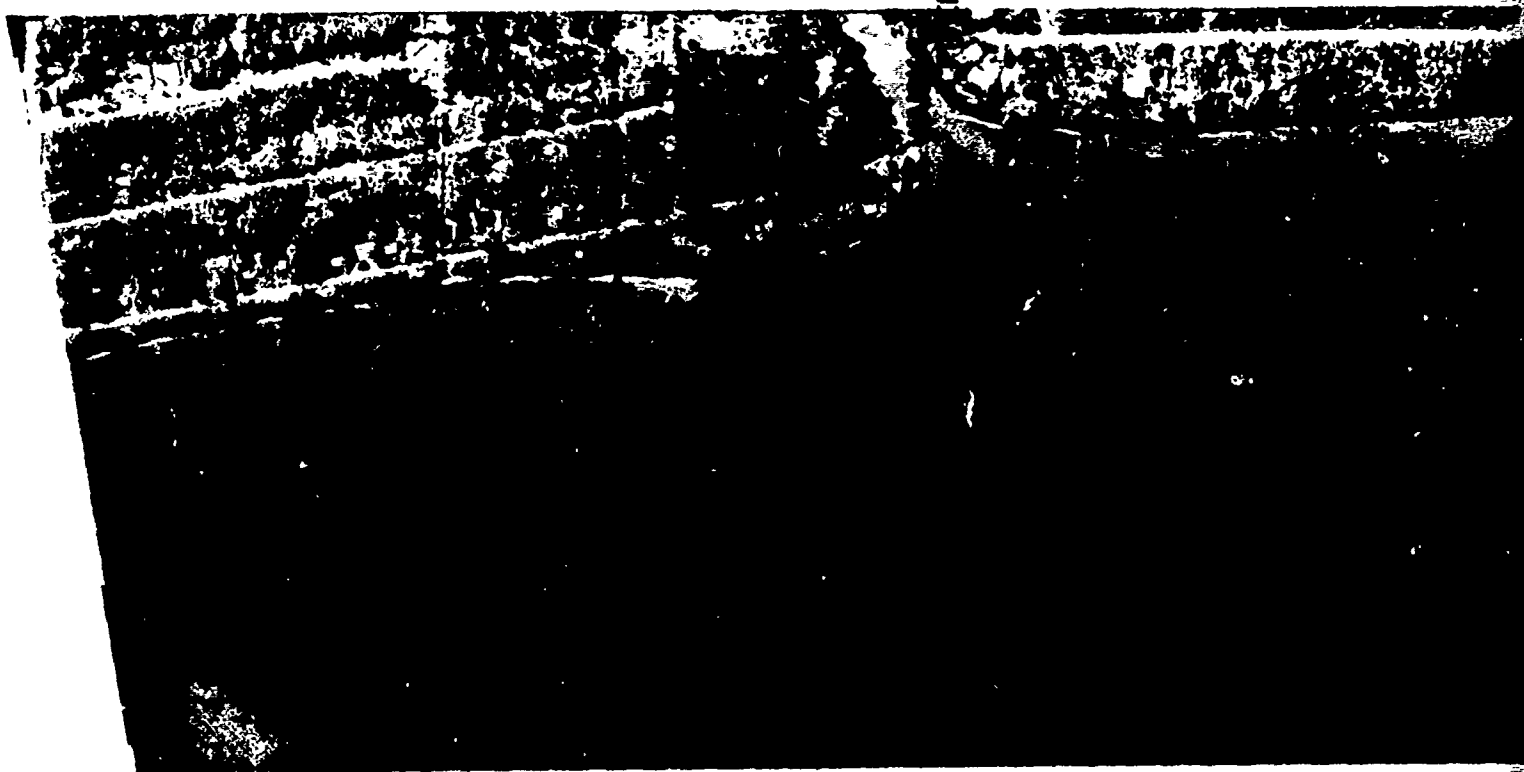


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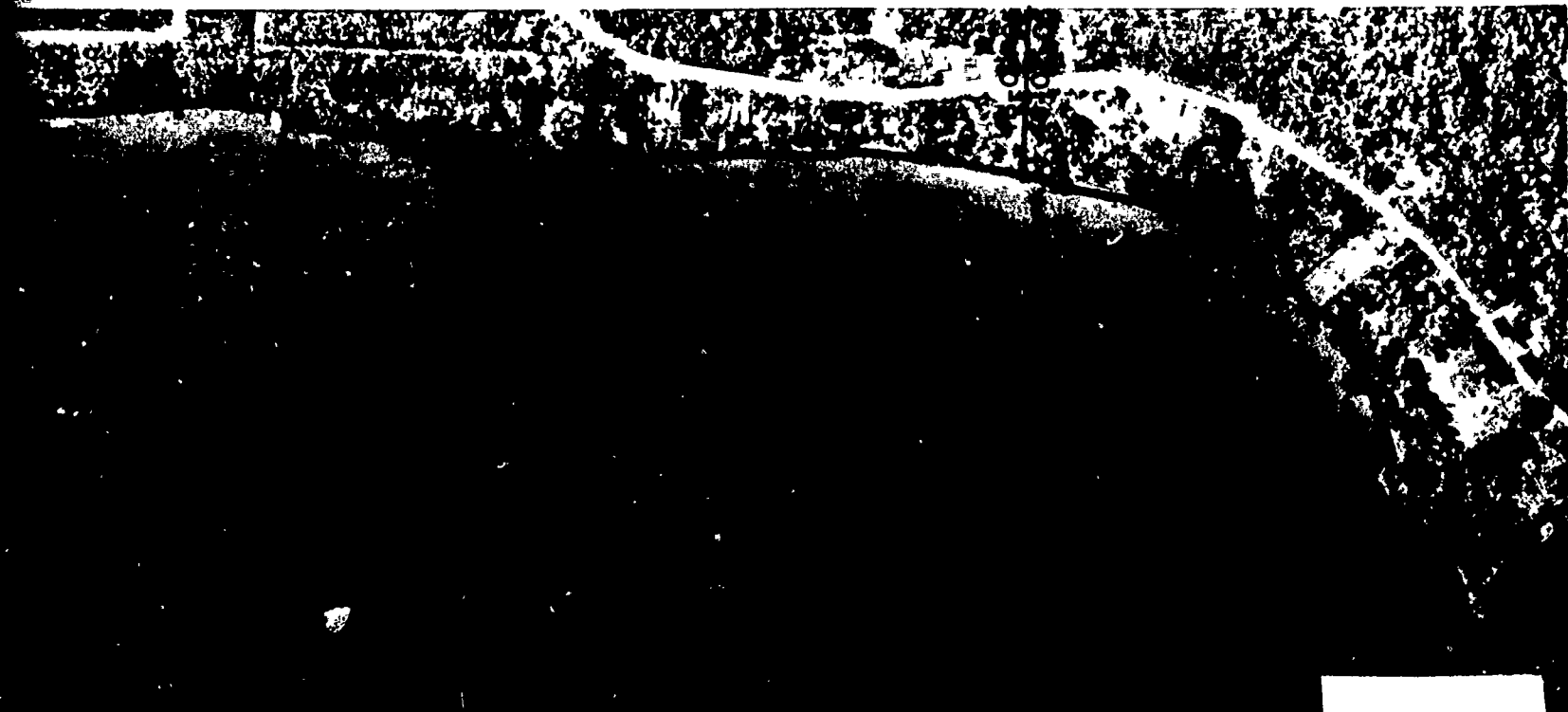


CHIPPEWA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 45
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN



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CHIPPEWA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 46
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN



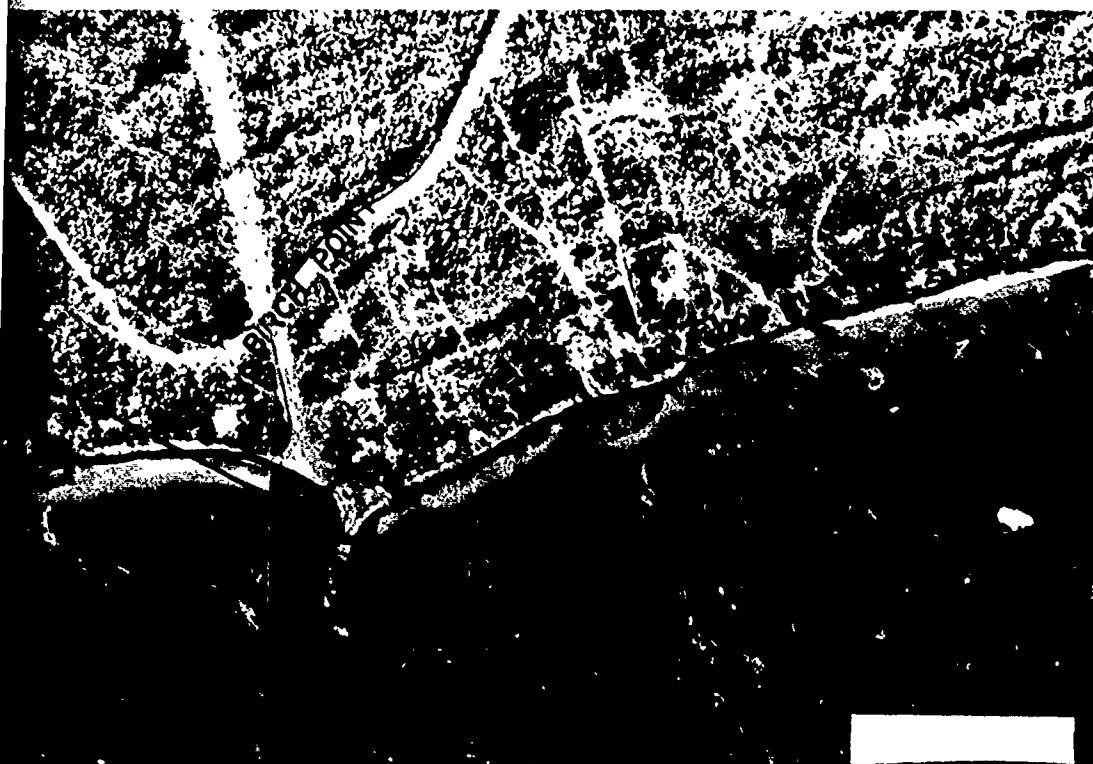
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CHIPPEWA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 47
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN



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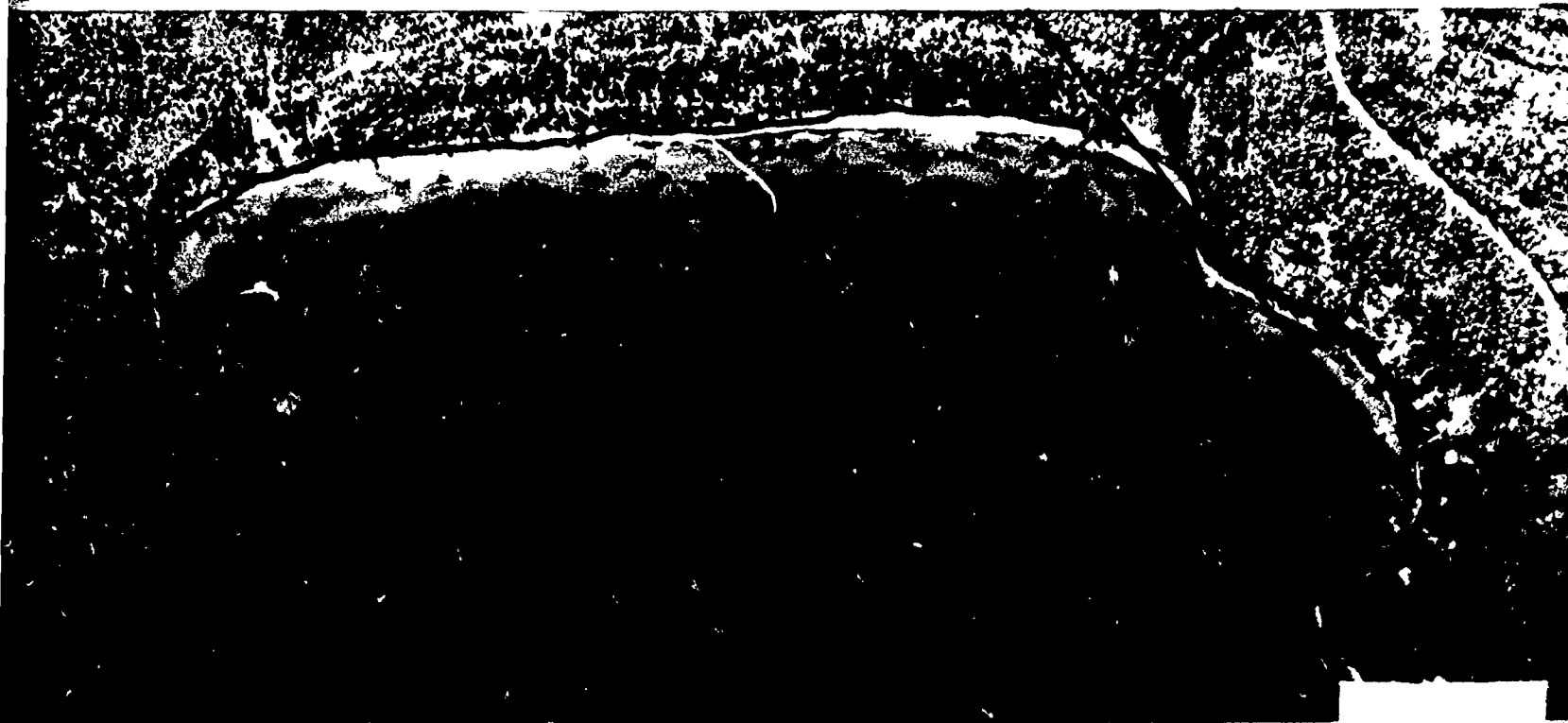
CHIPPEWA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 48
SCALE: 1" - 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN

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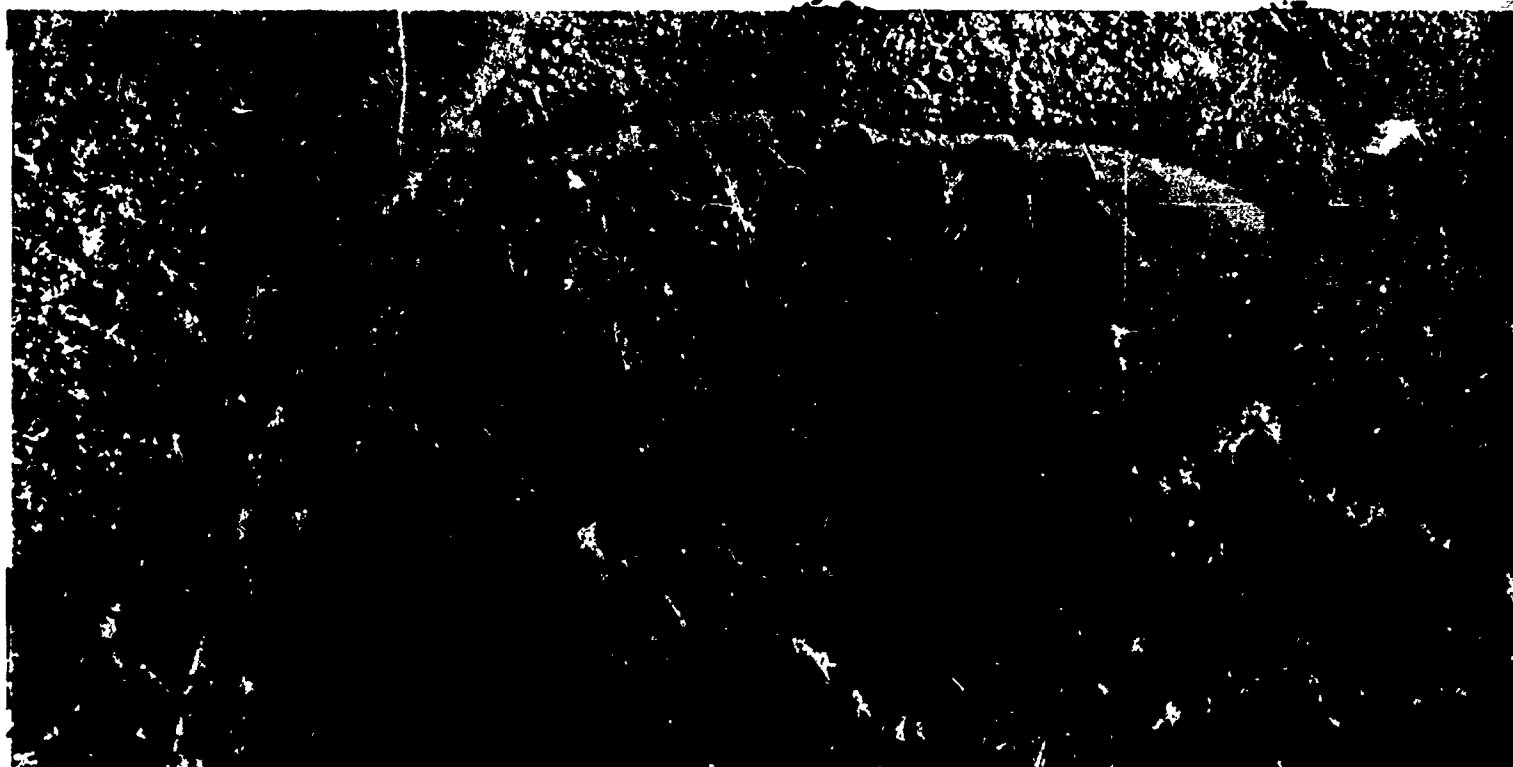


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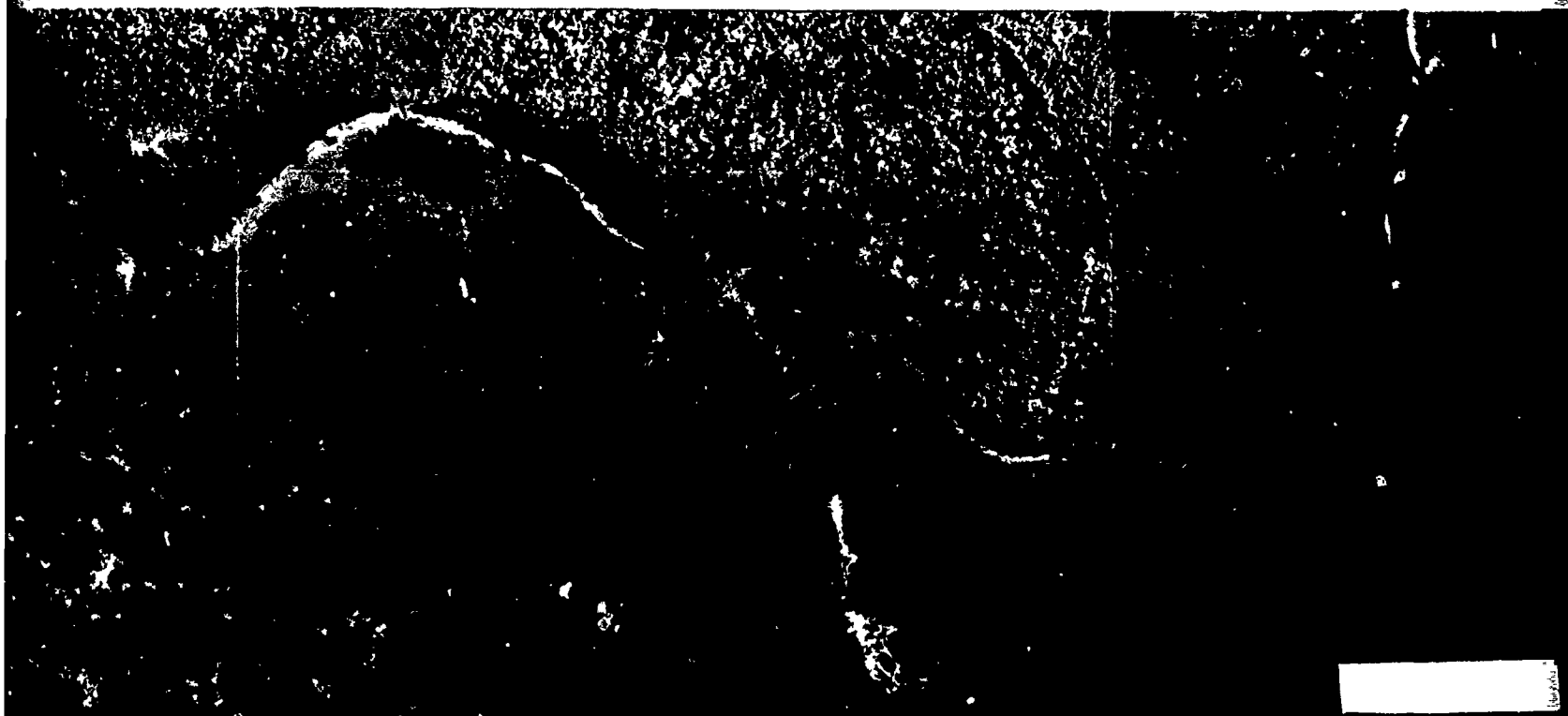
CHIPPEWA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 49
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN



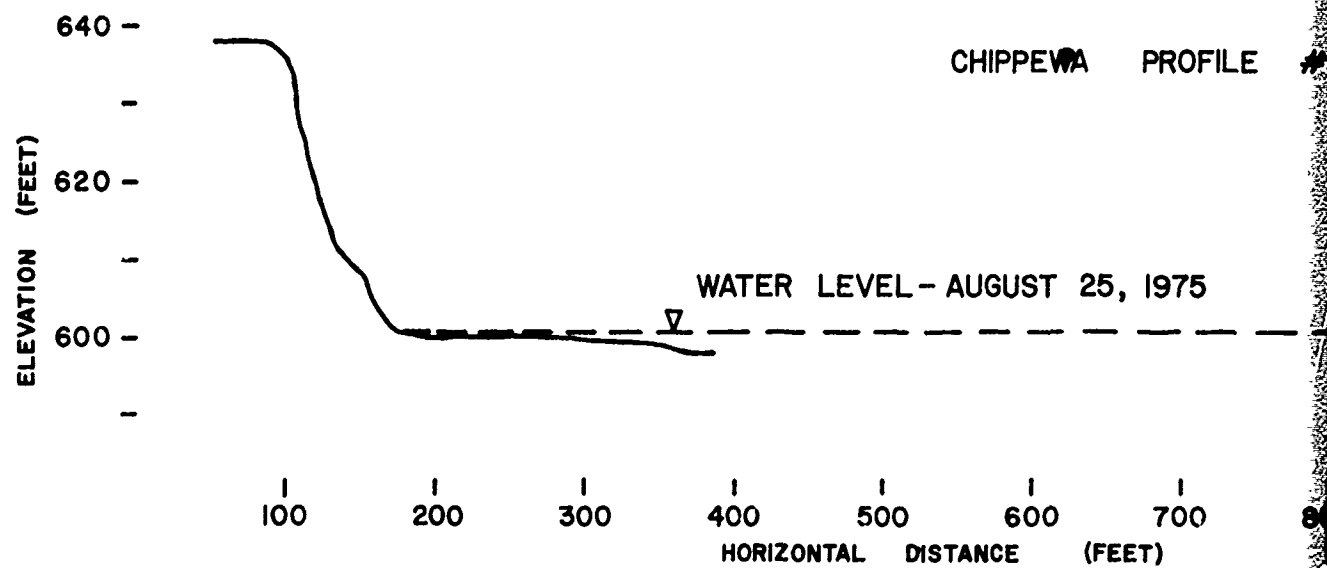
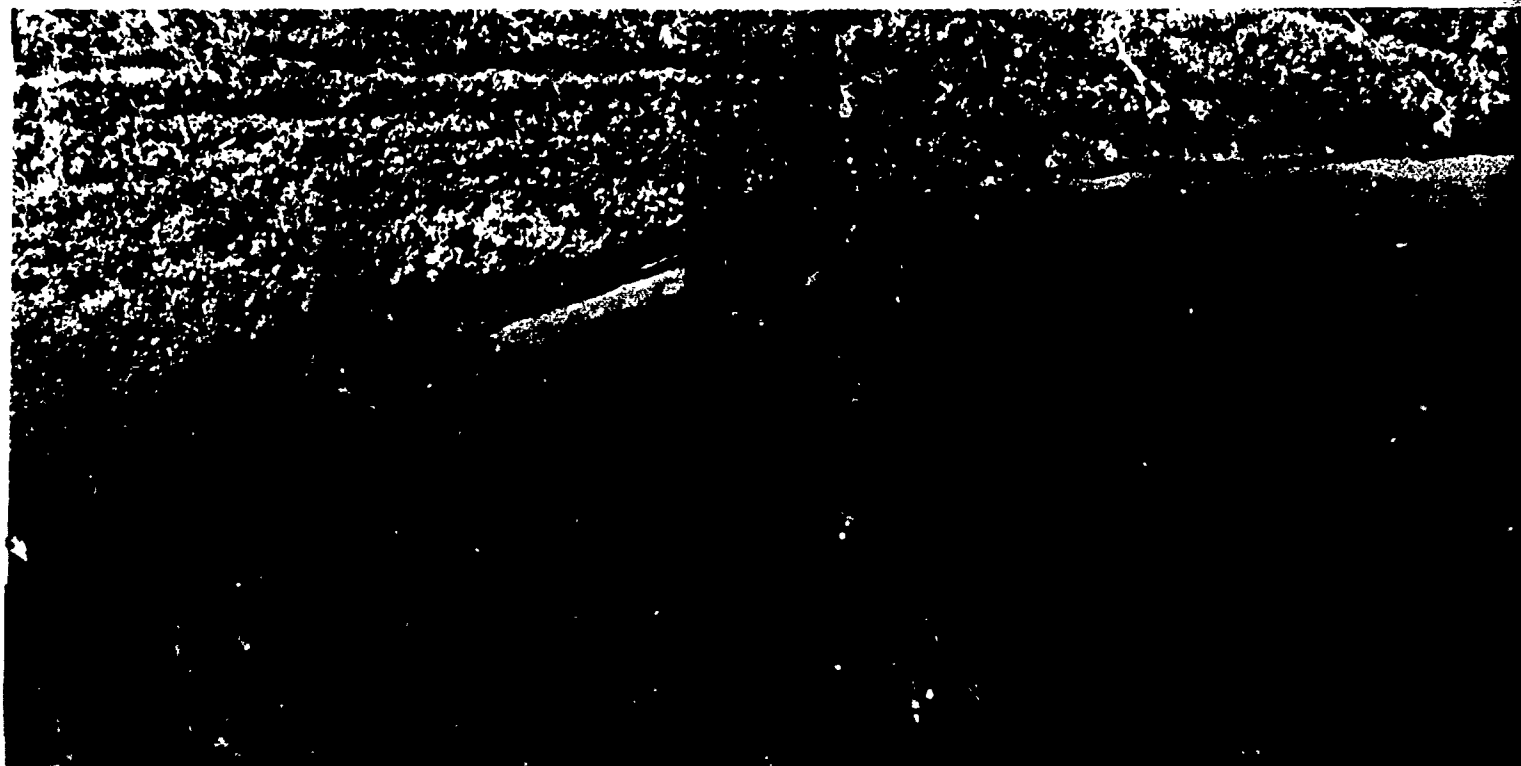
CHIPPewa COUNTY, MICHIGAN REACH 07

Variable	No. of Responses	Mean	Standard Error of Mean	Range		Adjusted Expanded Total for All Property Listings
				Minimum	Maximum	
Assessed Value (\$)	11	7800	4200	1000	48800	
Reported Market Value (\$)	9	98400	87800	400	800000	
Bluff Height (Ft.)	3	4	1	3	6	
Beach Depth (Ft.)	1	20		20	20	
Bluff Lost (Ft.)	3	14	4	17	30	
Beach Lost (Ft.)	4	22	4	15	32	
Damages Erosion (\$)	4	14850	13750	200	56000	
Damages Flooding (\$)	0					
Damages - Erosion and Flooding (\$)						12,000
Protective Structure Cost (\$)	2	700	500	200	1200	3,000
Total Damages (\$)	4	15200	13650	200	66000	105,000

Total Identified Residential Properties: 19 11-Administered Assessment Respondents: 11



CHIPPEWA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 50
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN



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PROFILE # 4

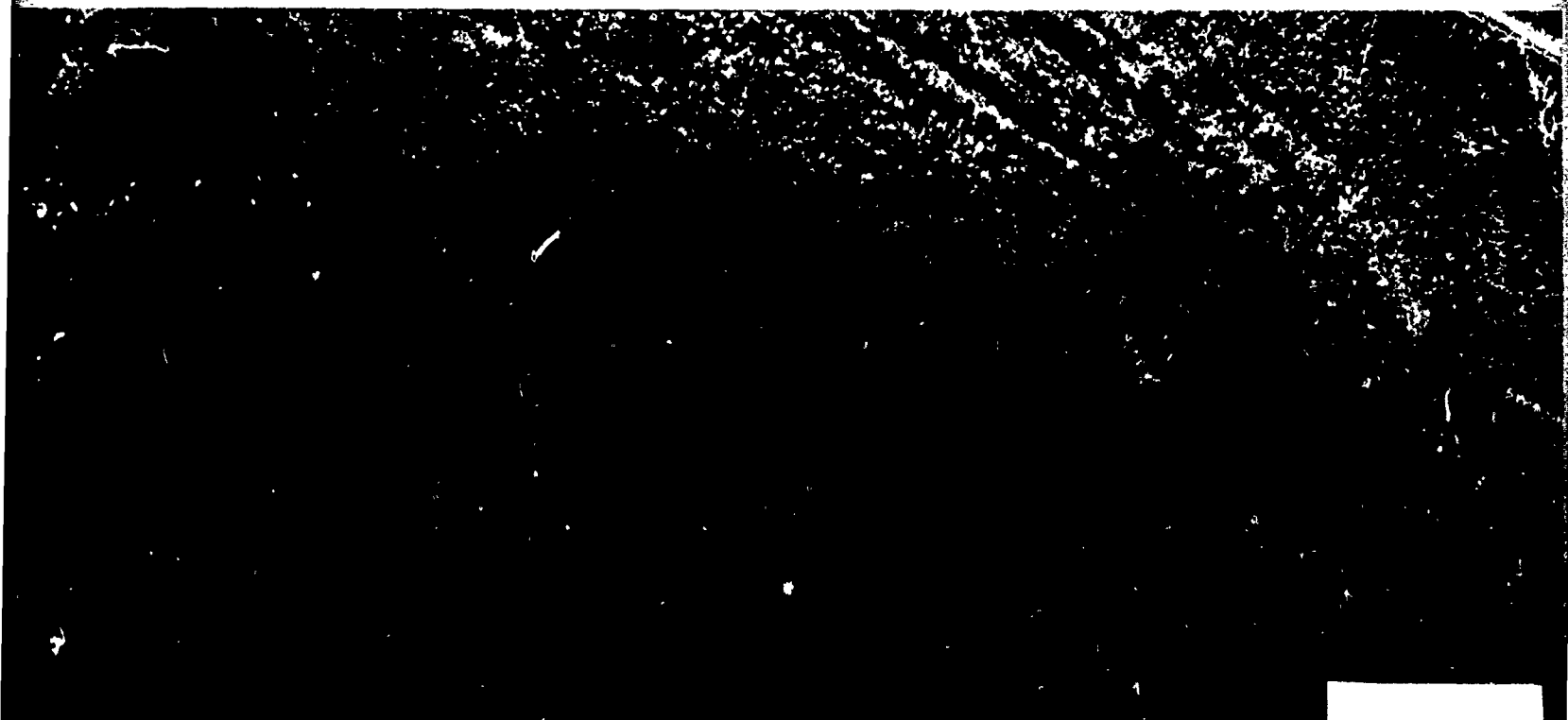
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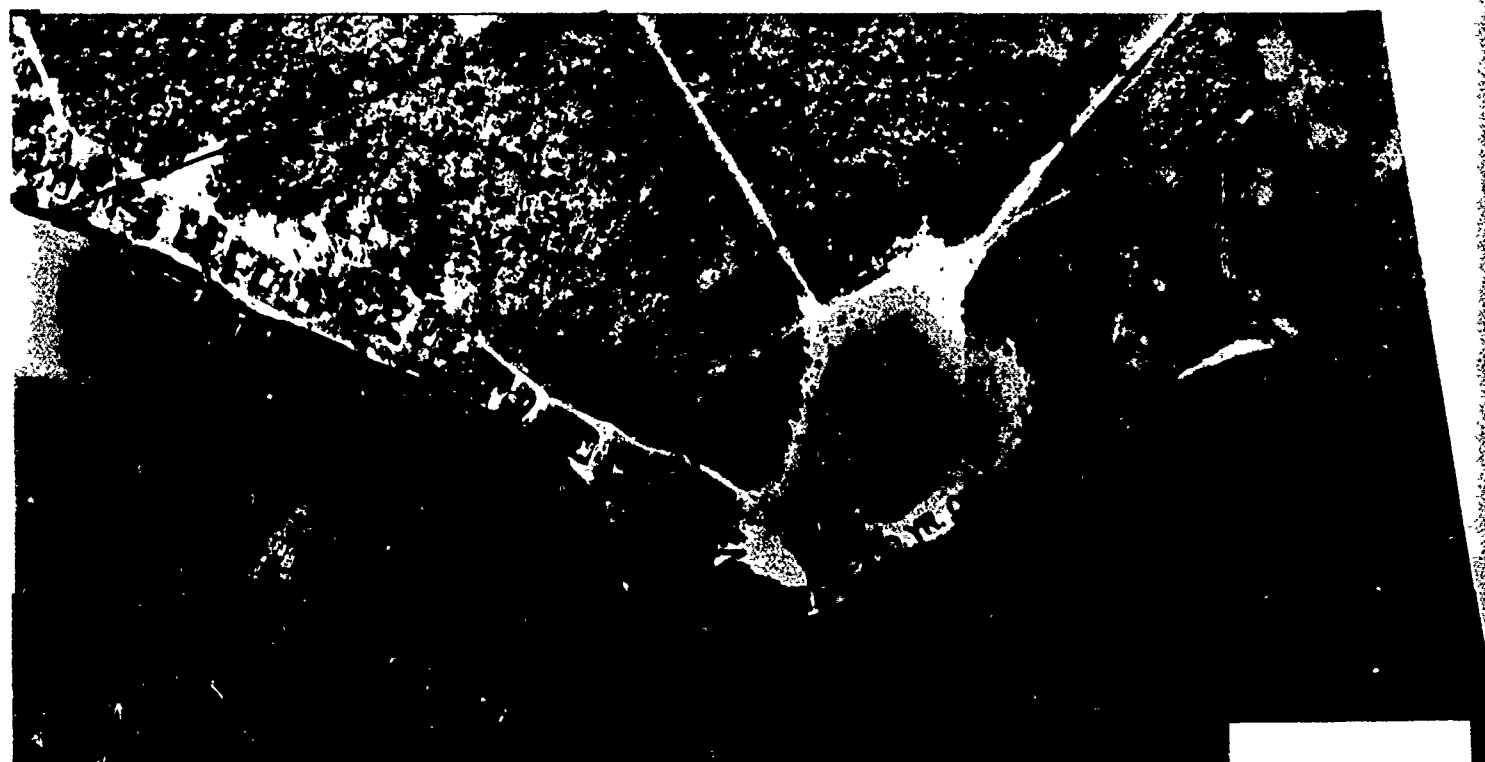
CHIPPEWA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 51
SCALE: 1" = 500'
COASTAL ZONE LABORATORY



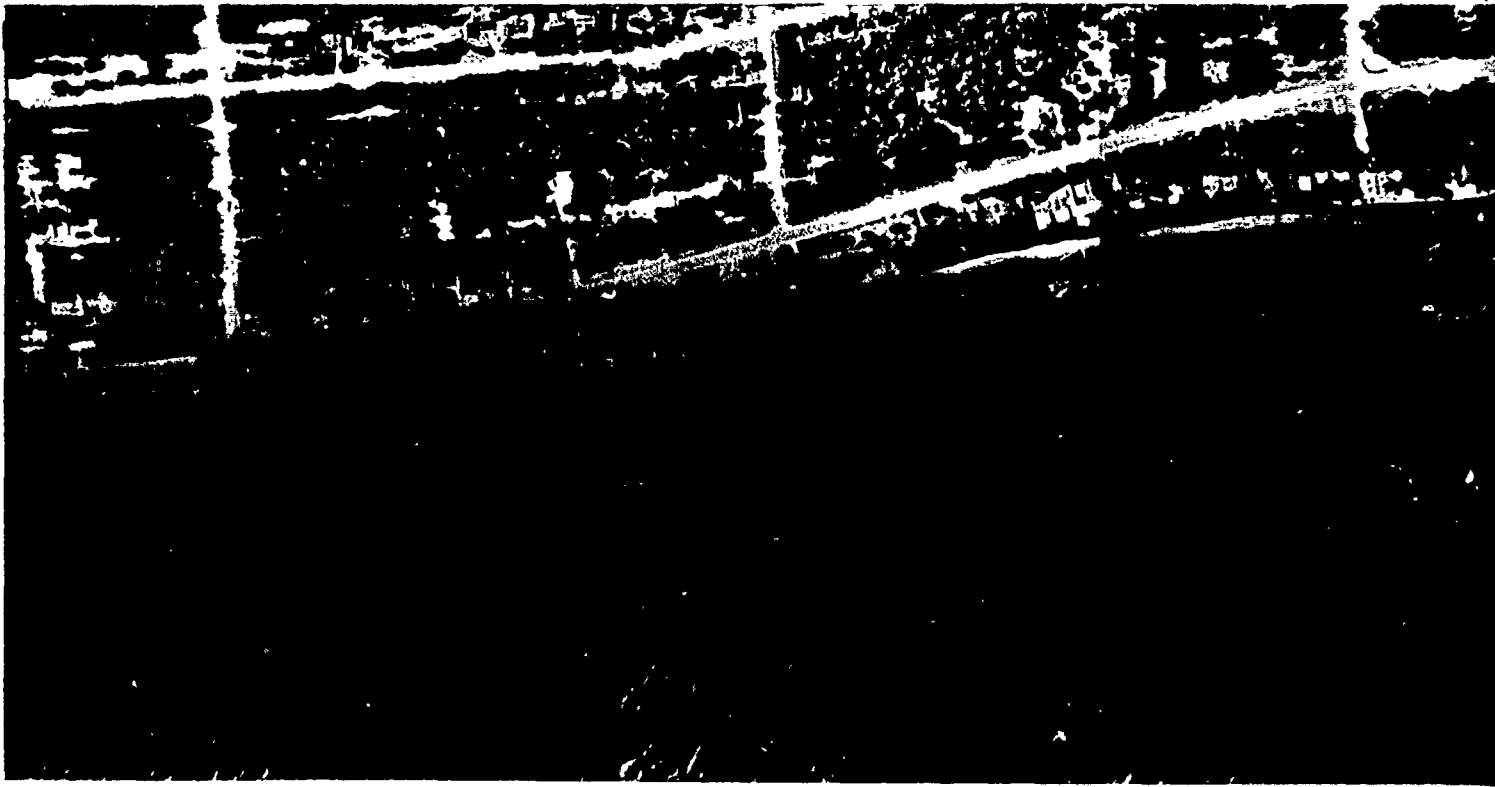
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CHIPPEWA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 52
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN



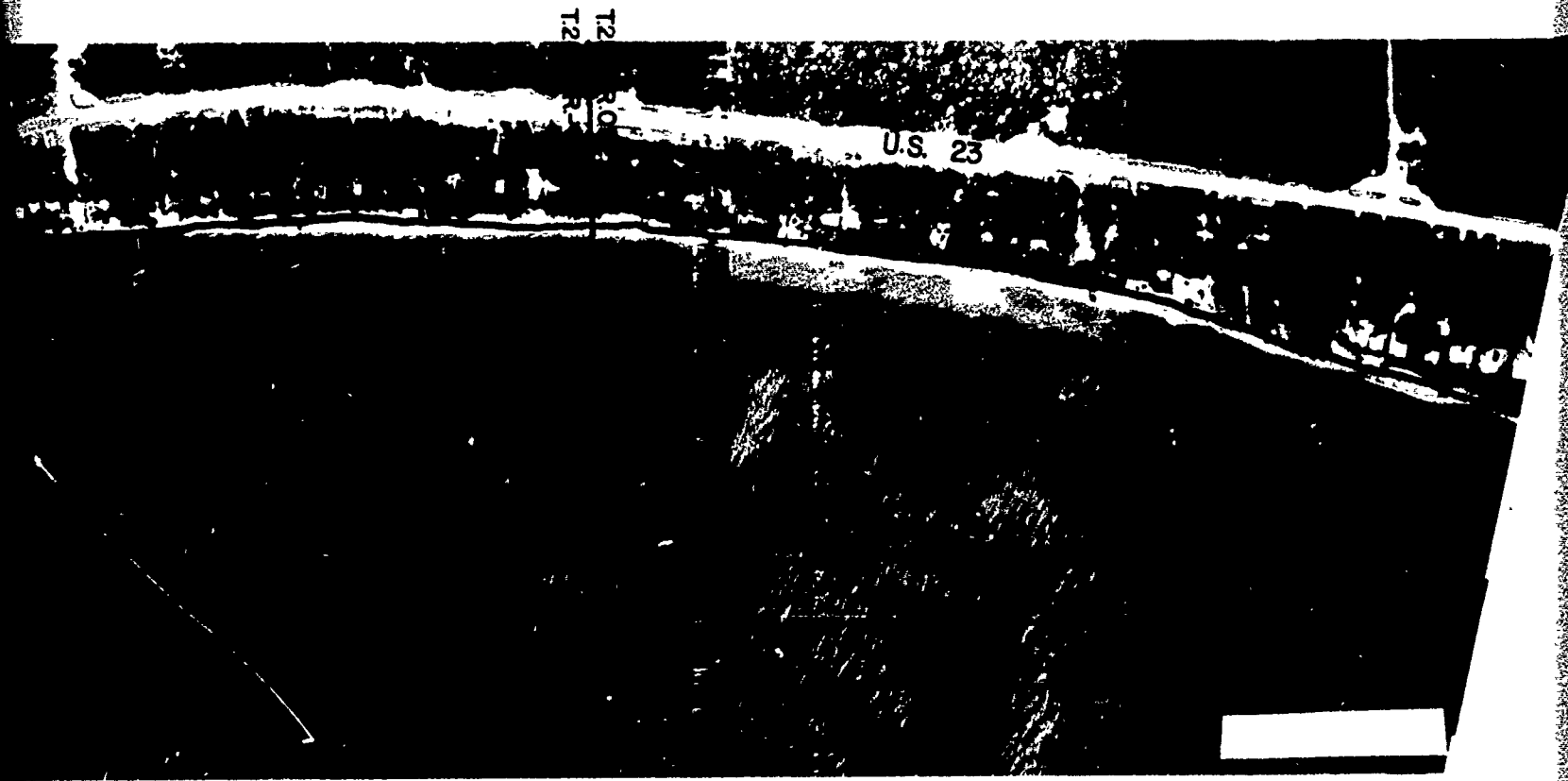
CHIPPEWA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 53
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN



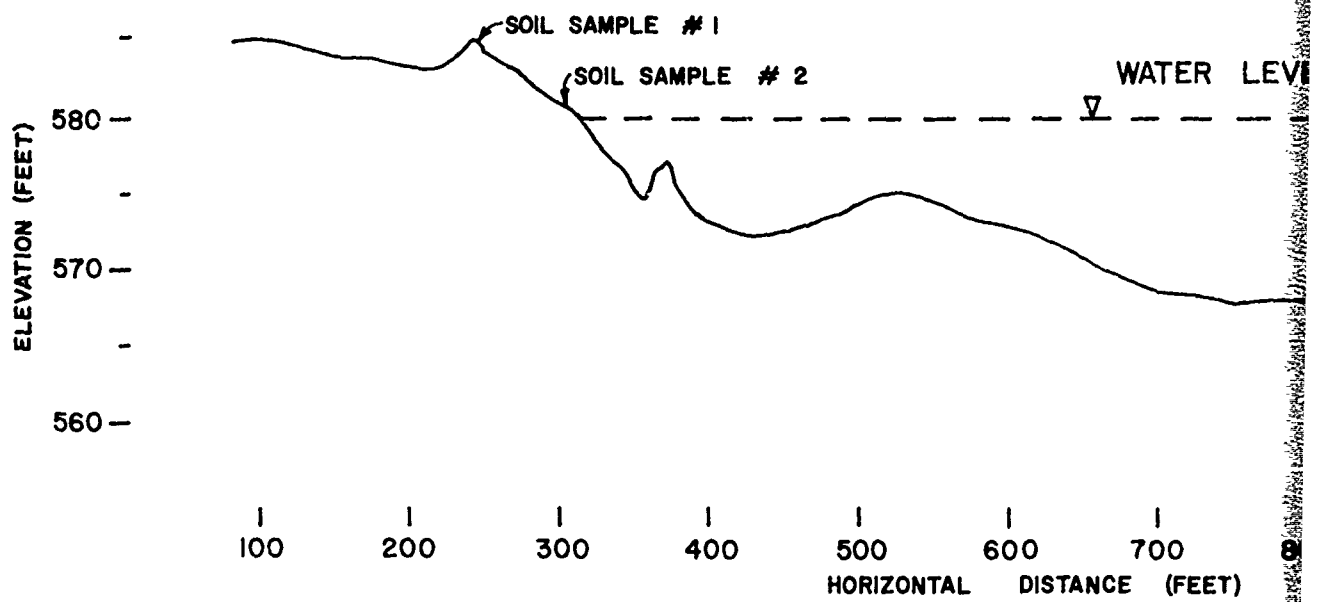
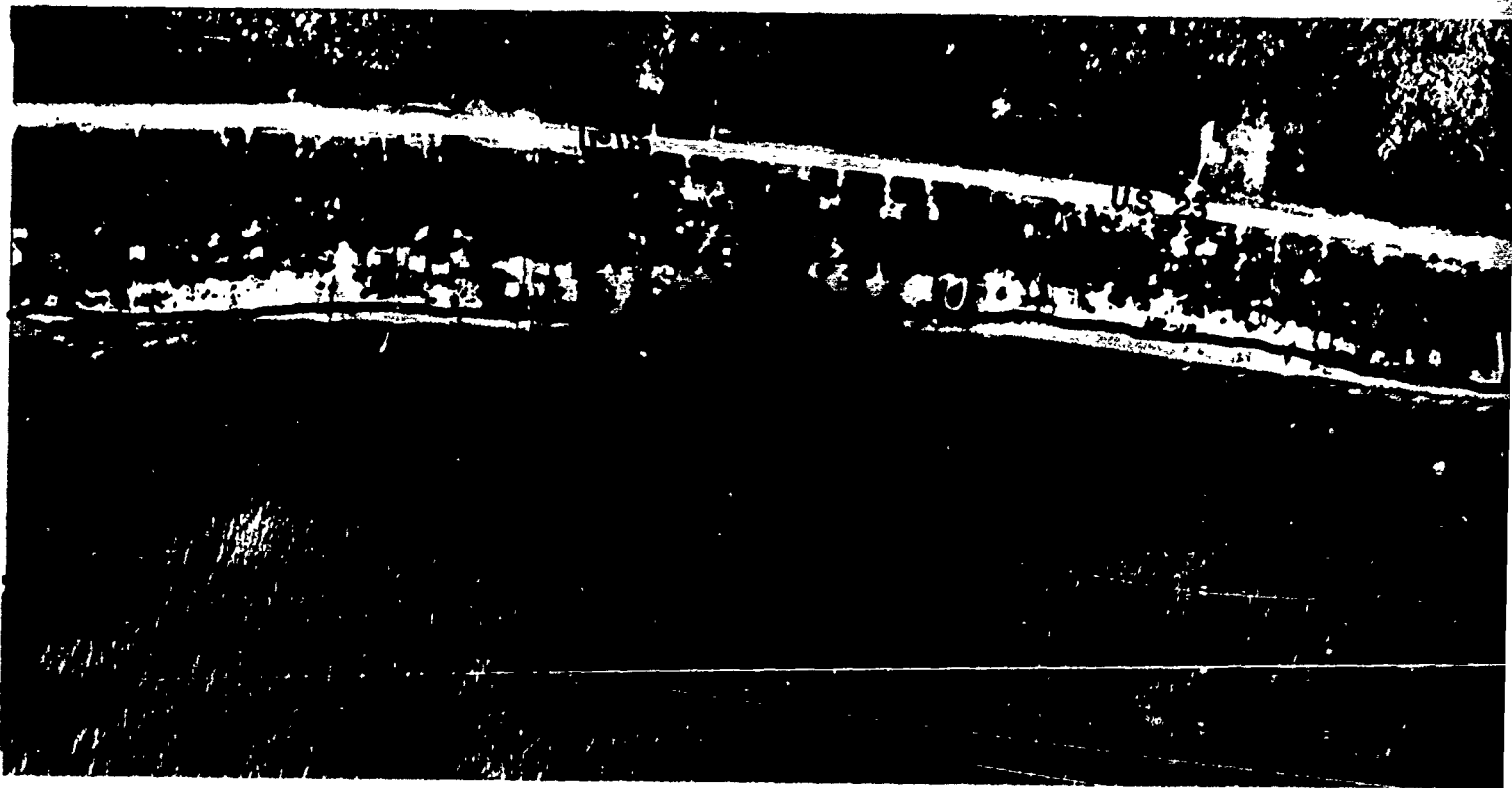
ALCONA COUNTY, MICHIGAN REACH #1

Variable	No. of Responses	Mean	Standard Error of Mean	Range		Adjusted Expanded Total for All Property Listings
				Minimum	Maximum	
Assessed Value (\$)	425	11500	400	100	77300	
Reported Market Value (\$)	290	27800	1400	1900	300000	
Bluff Height (Ft.)	152	18	2	1	200	
Beach Depth (Ft.)	185	50	5	1	300	
Bluff Lost (Ft.)	115	26	3	-2	99	
Beach Lost (Ft.)	210	48	3	3	225	
Damages Erosion (\$)	81	3250	750	10	45000	
Damages Flooding (\$)	54	1300	250	50	10000	
Damages - Erosion and Flooding (\$)						521,000
Protective Structure Cost (\$)	59	1750	500	50	21500	170,000
Total Damages (\$)	124	3500	600	50	45000	691,000

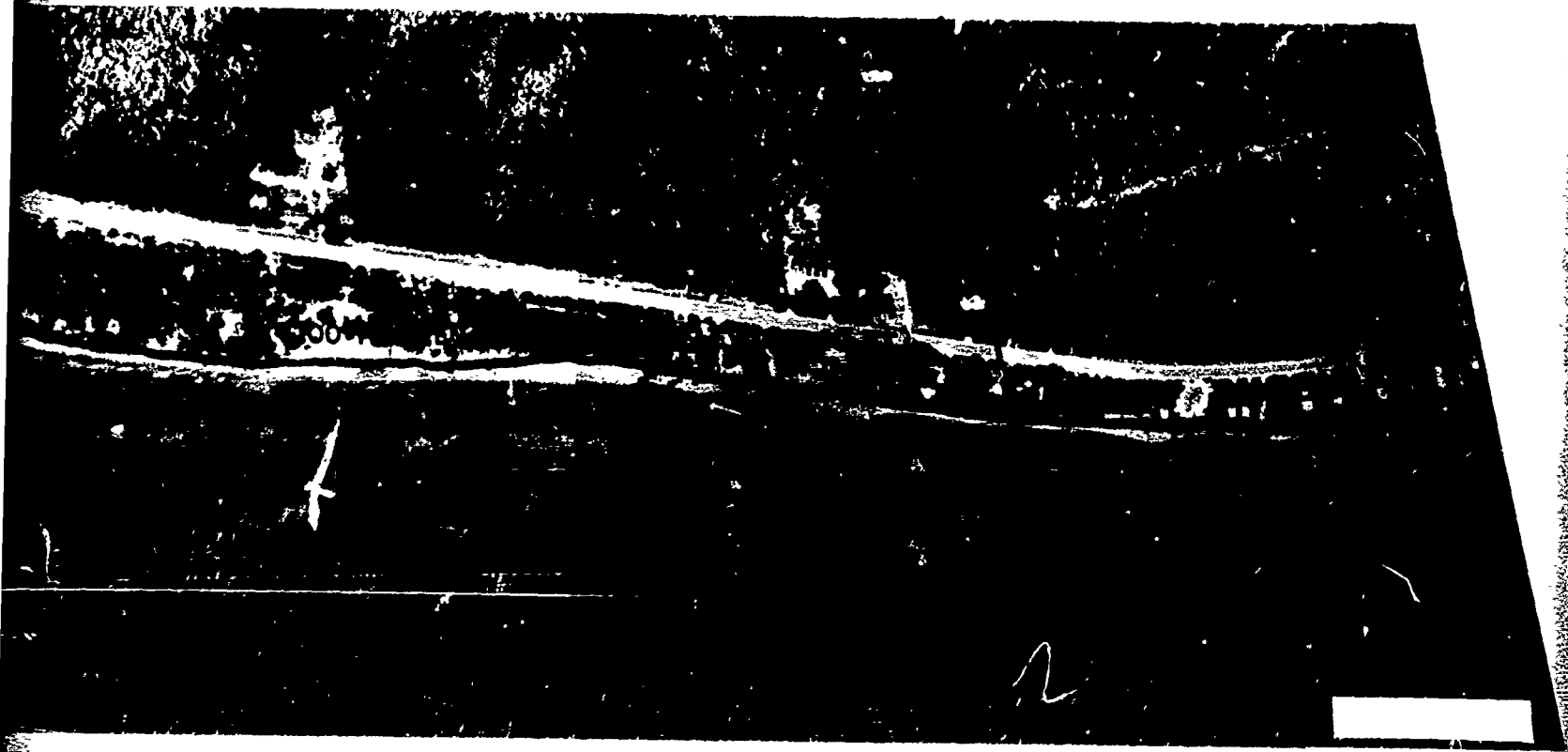
Total Identified Residential Properties: 672 Self-Administered Assessment Respondents: 417



ALCONA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 1
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN

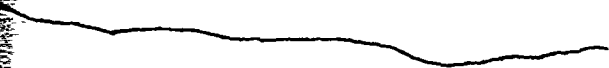


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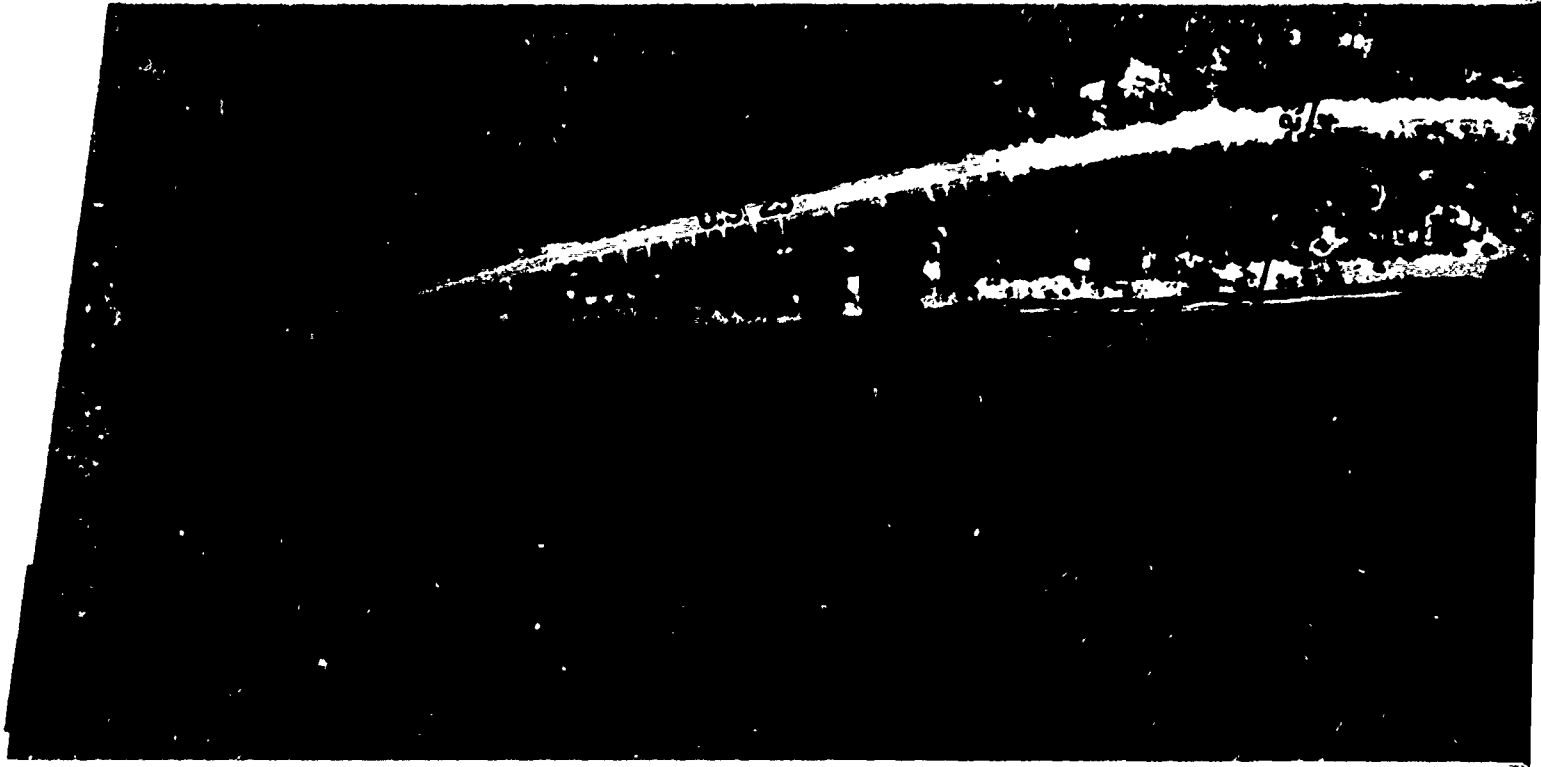
WATER LEVEL - JUNE 1, 1975

ALCONA PROFILE # 1

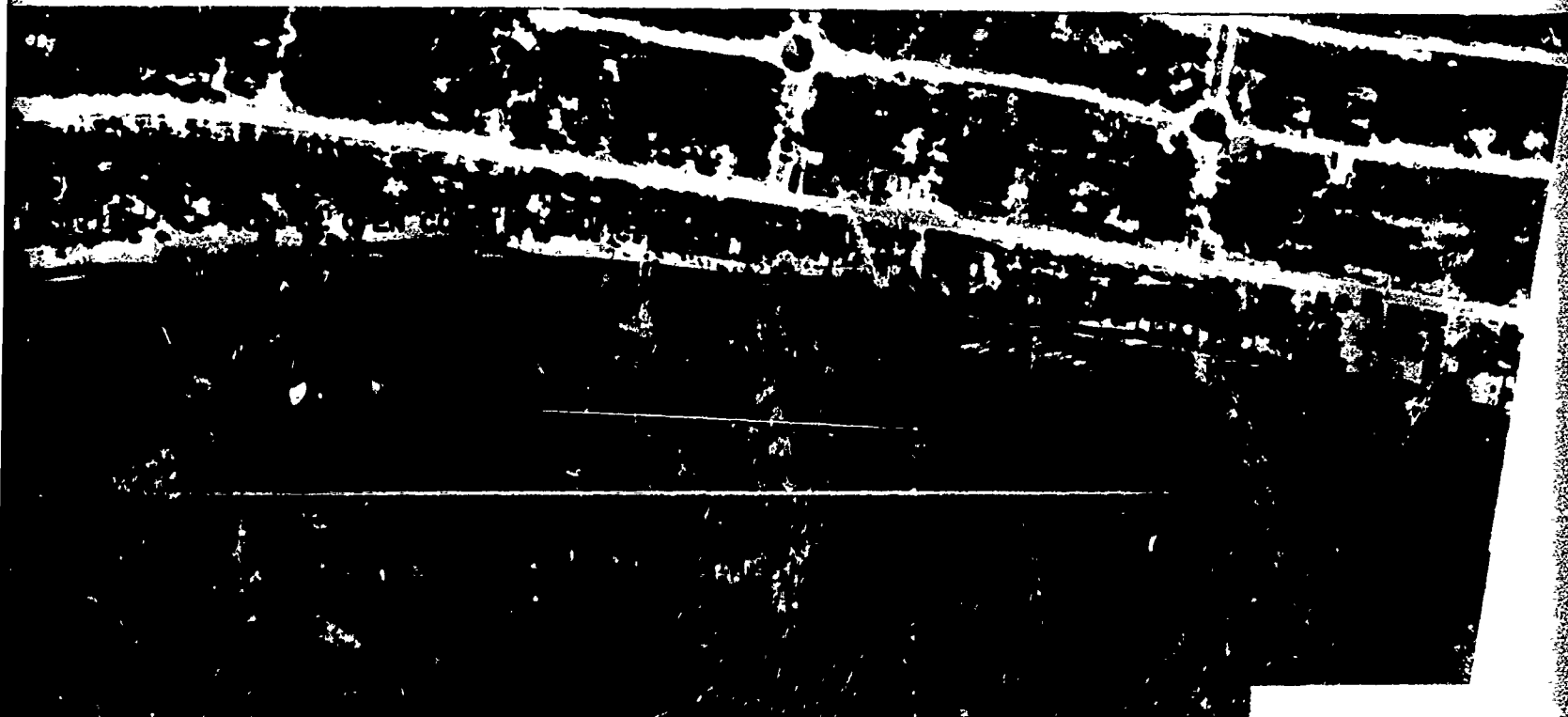


ALCONA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 2
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN

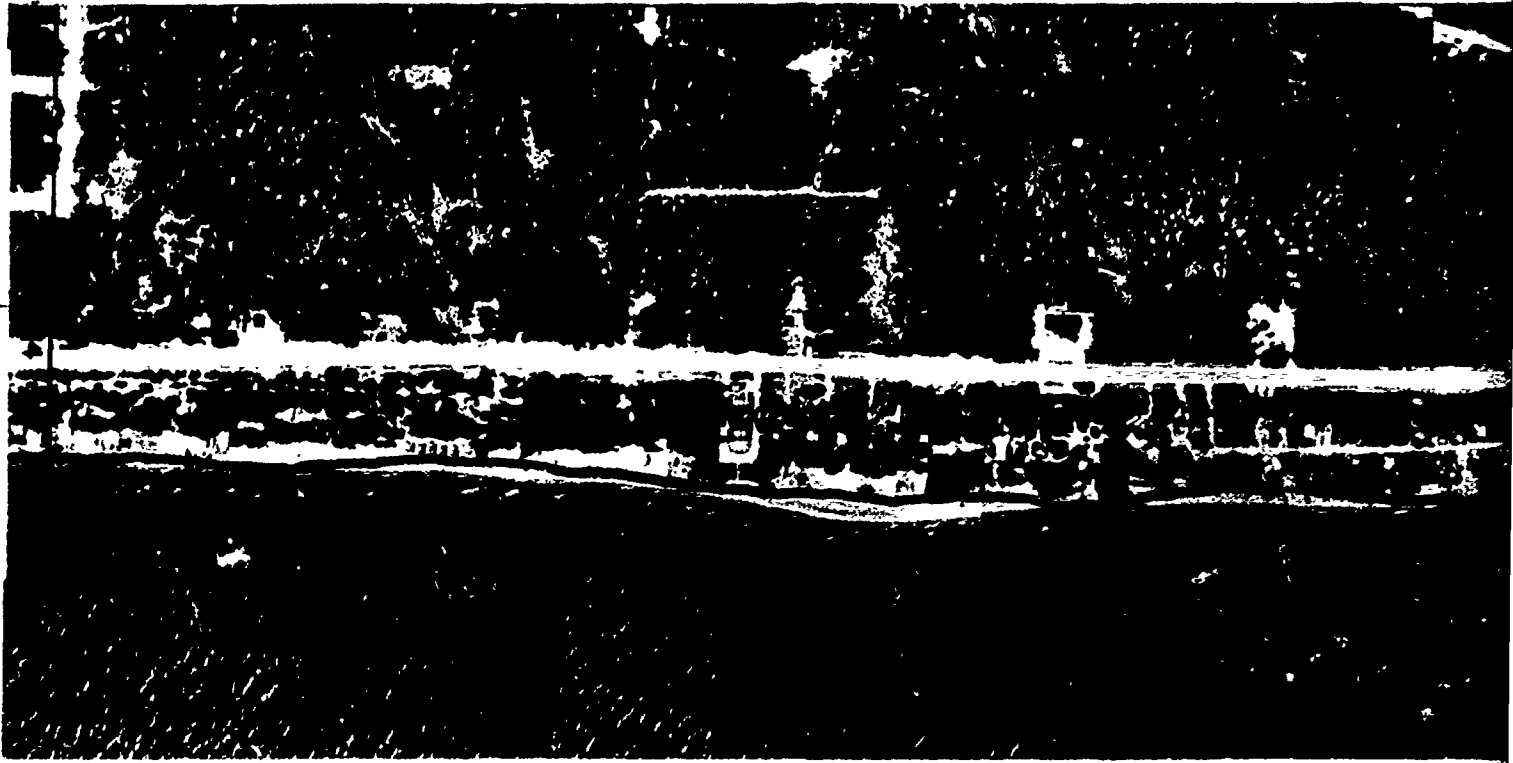
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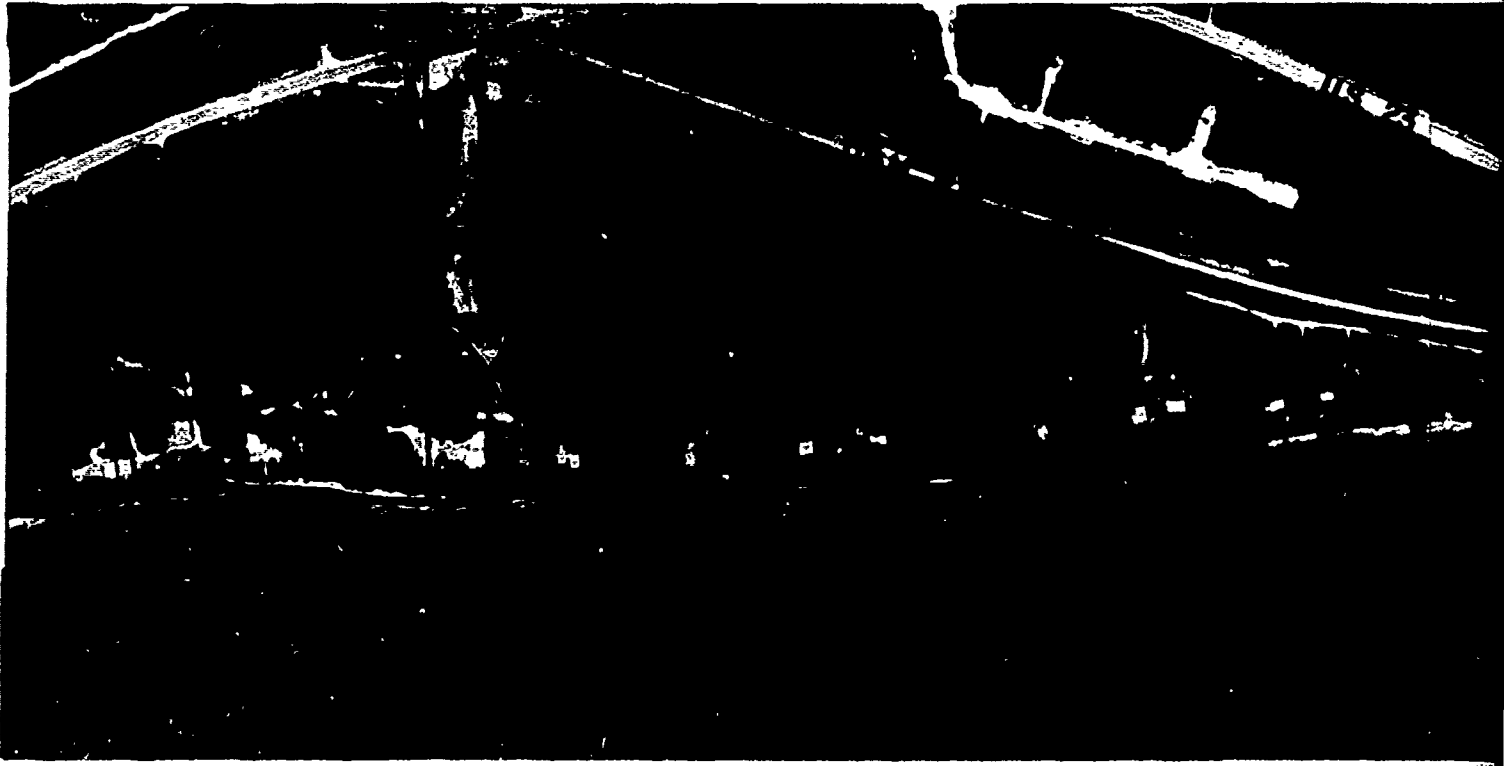
ALCONA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 3
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN

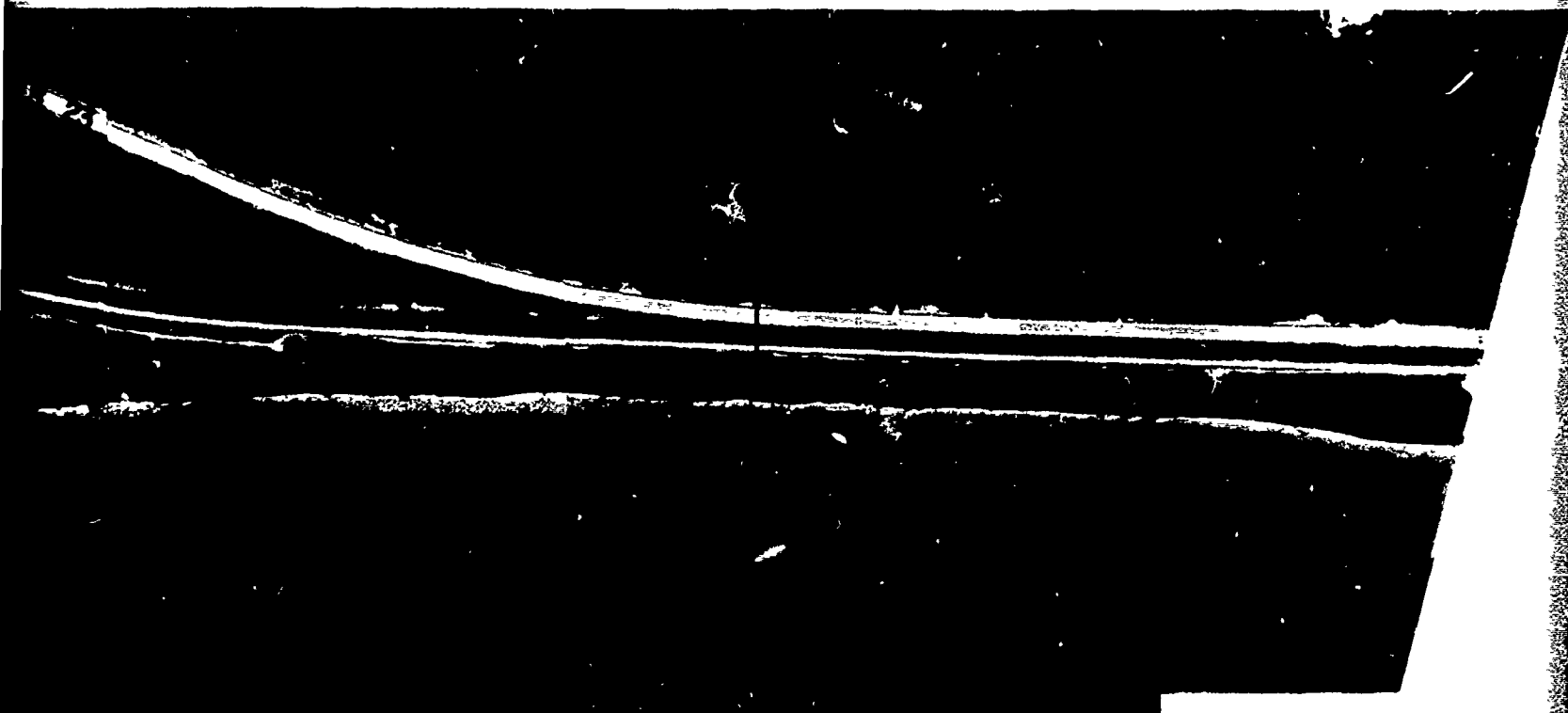


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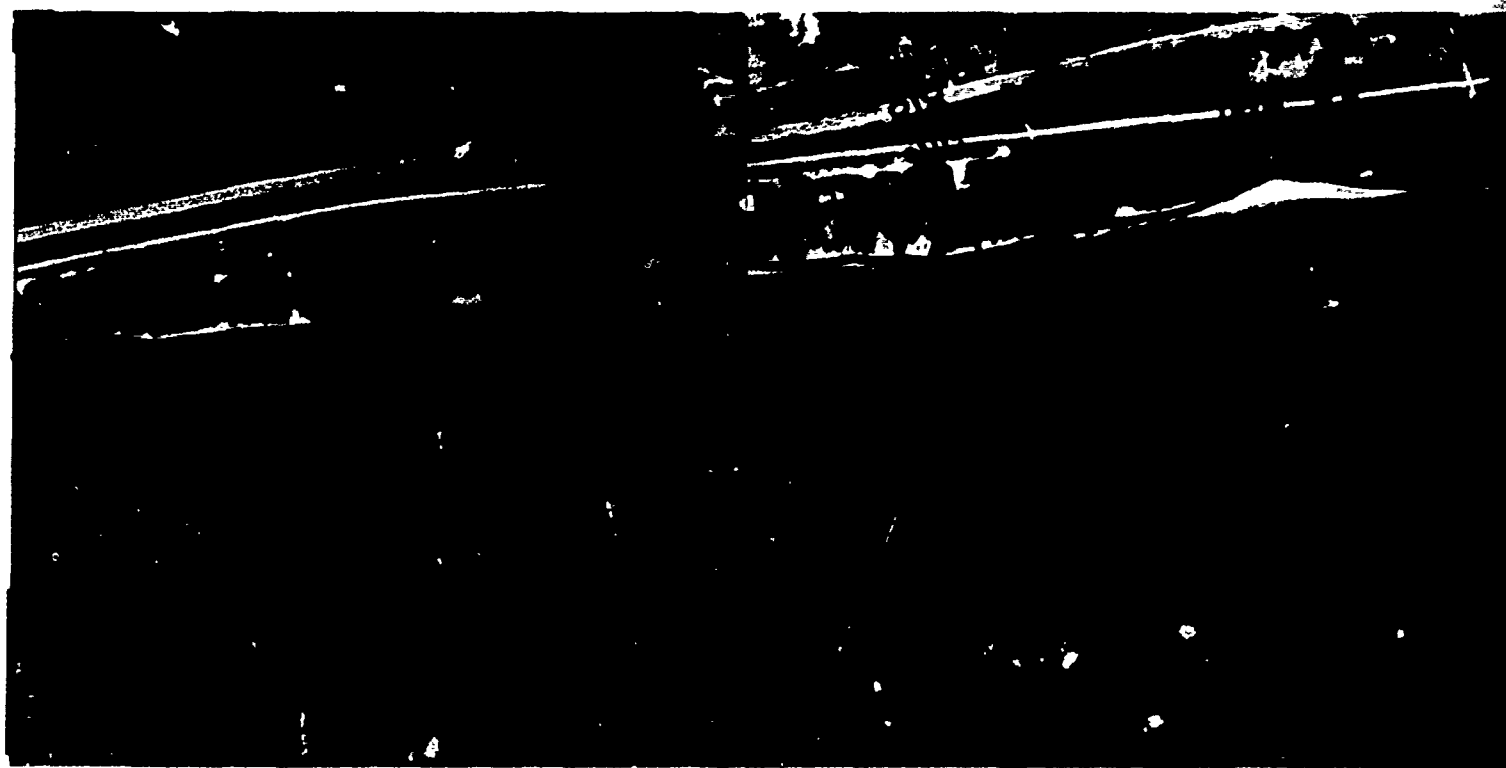
ALCONA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 4
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN





ALCONA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 5
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN

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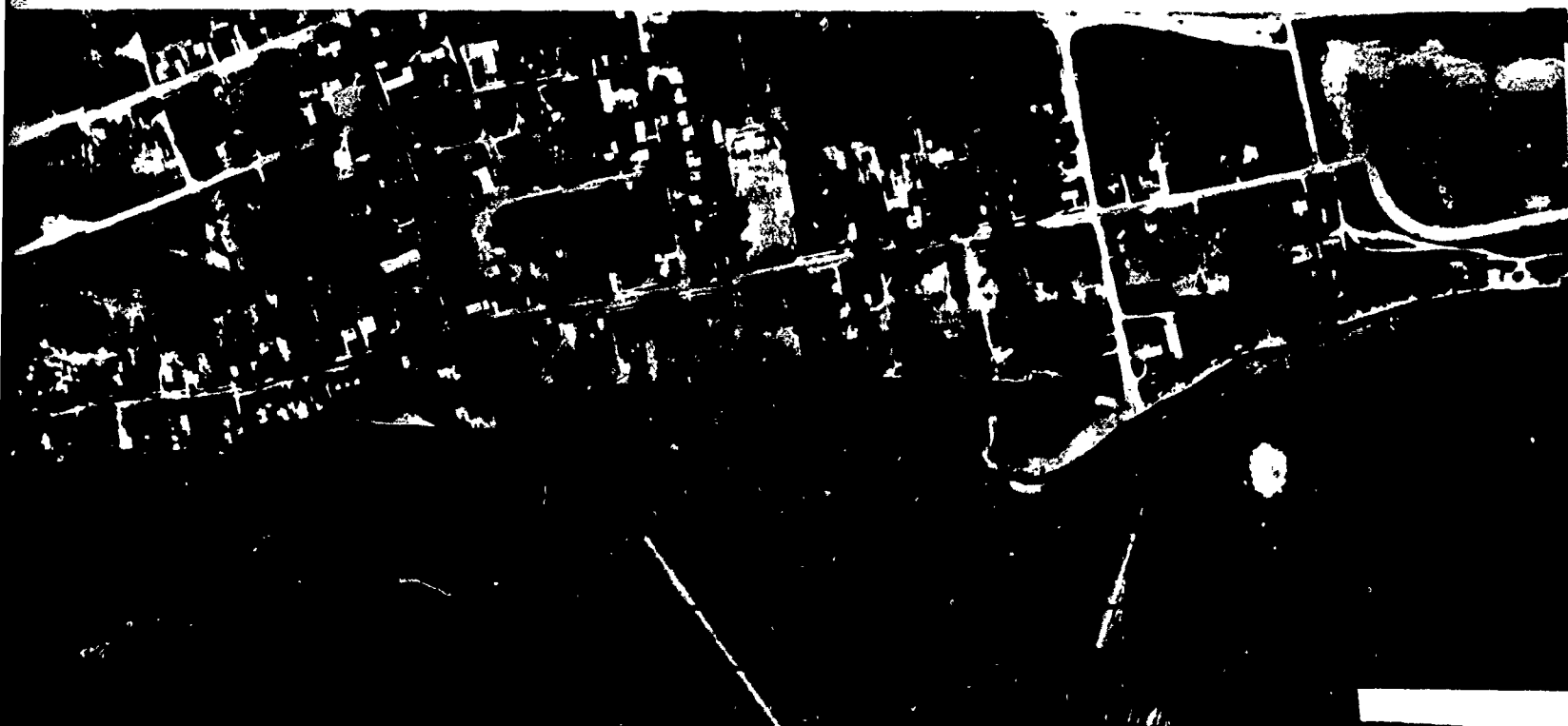


ALCONA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 6
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN

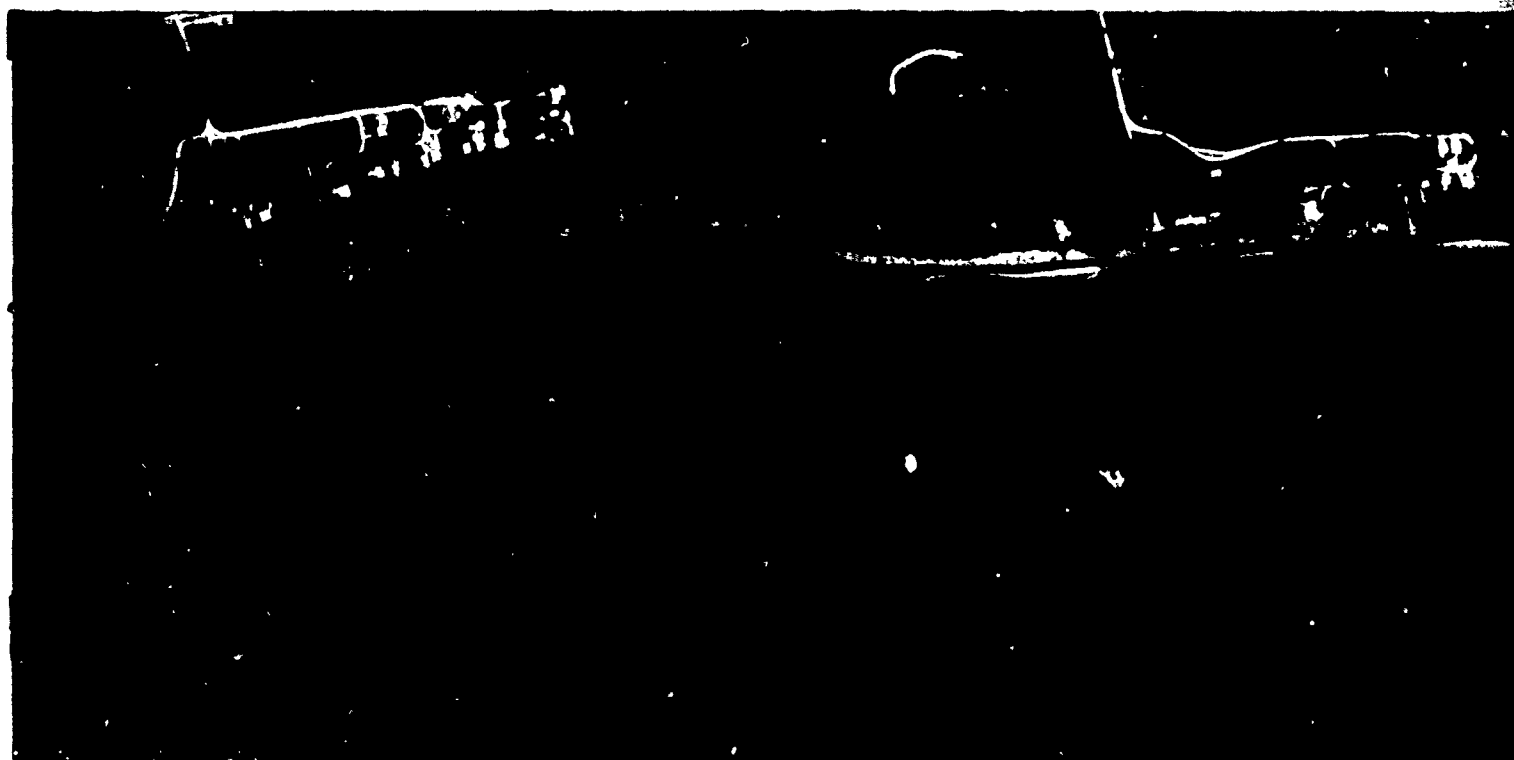


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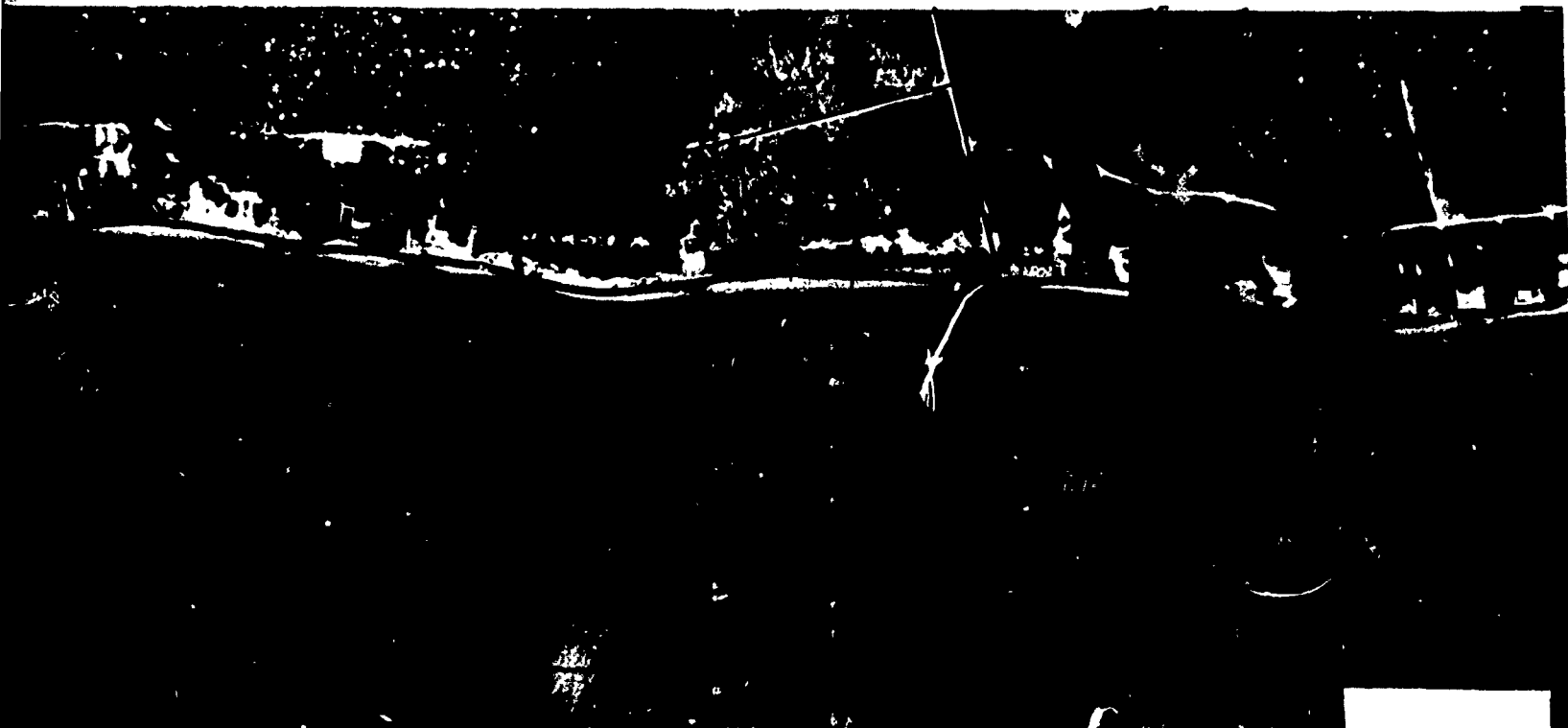
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ALCONA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 7
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN



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ALCONA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 8
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN



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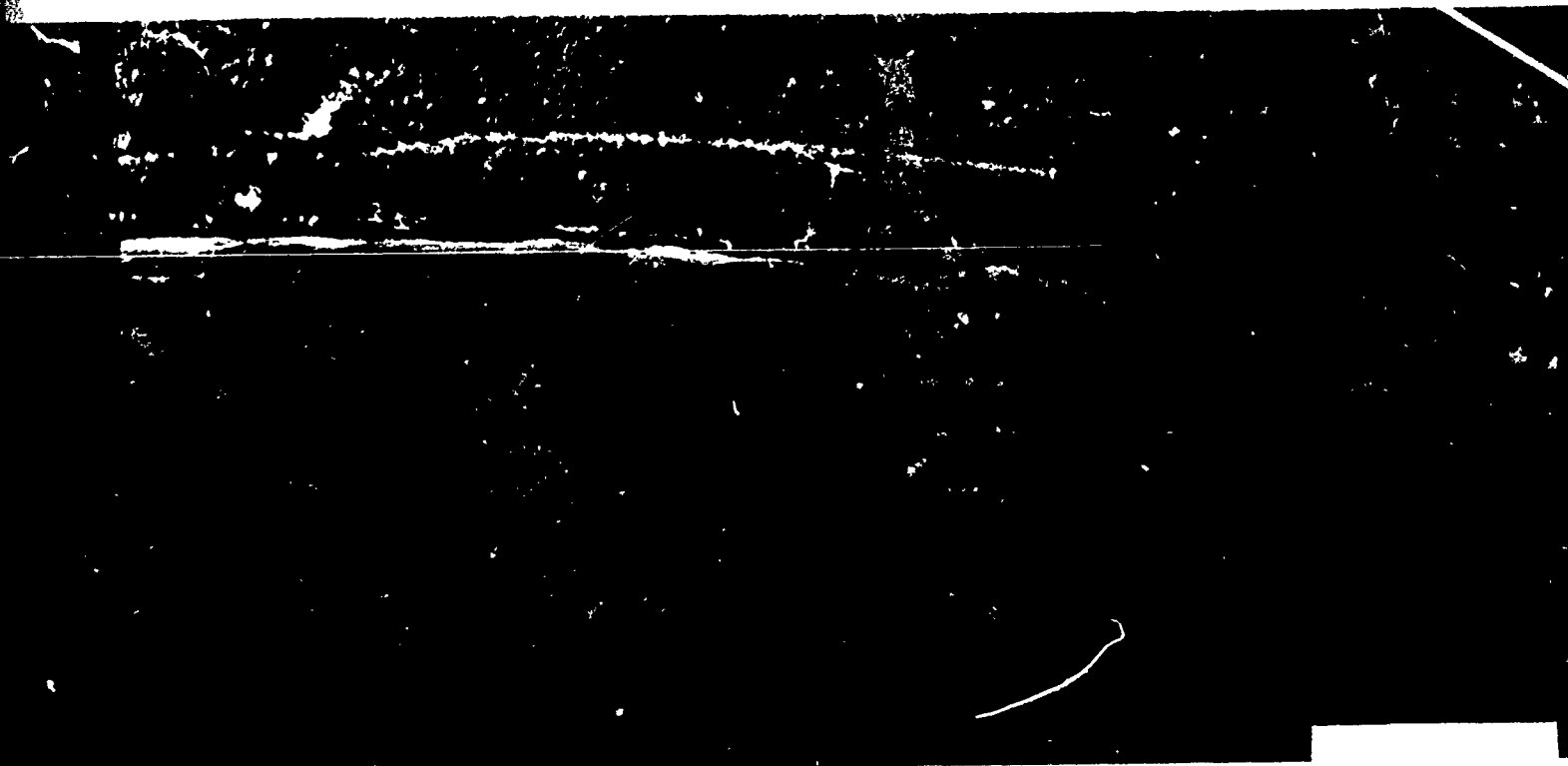
ALCONA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 9
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN



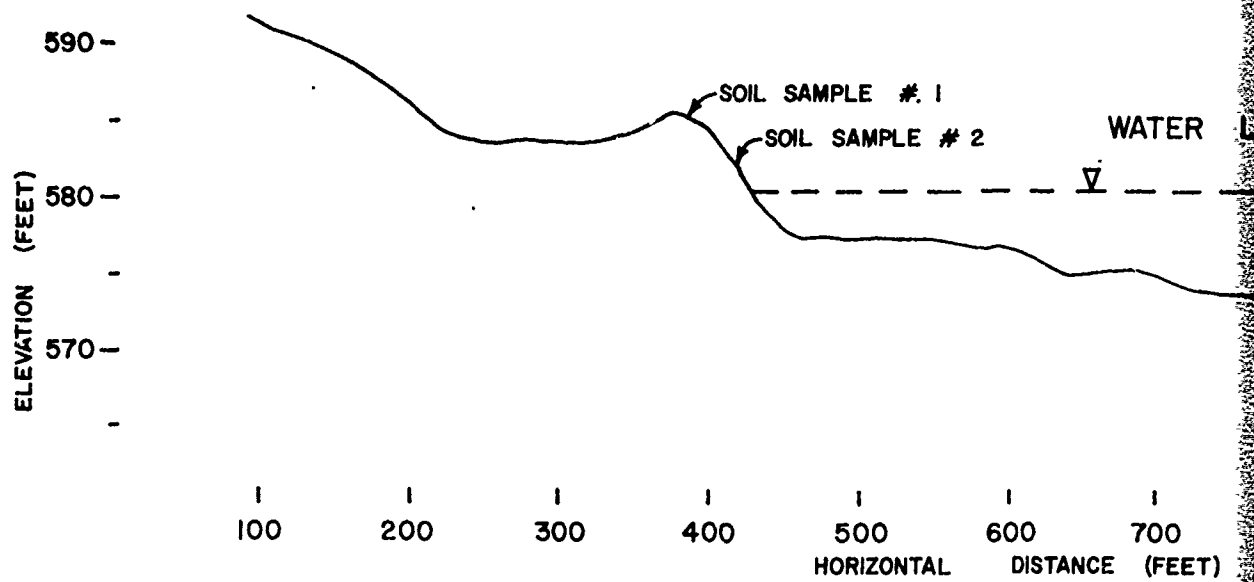
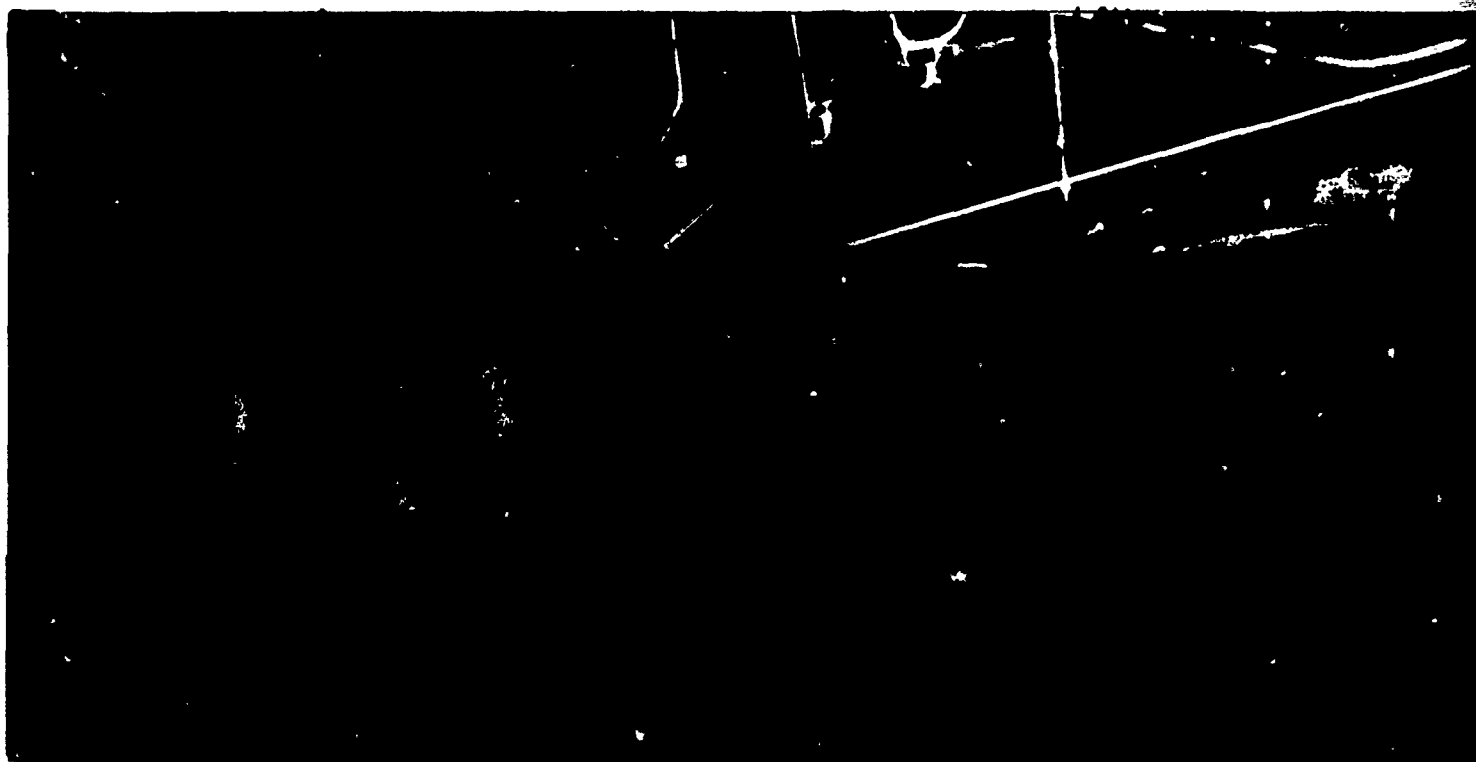
ALCONA COUNTY, MICHIGAN BEACH #2

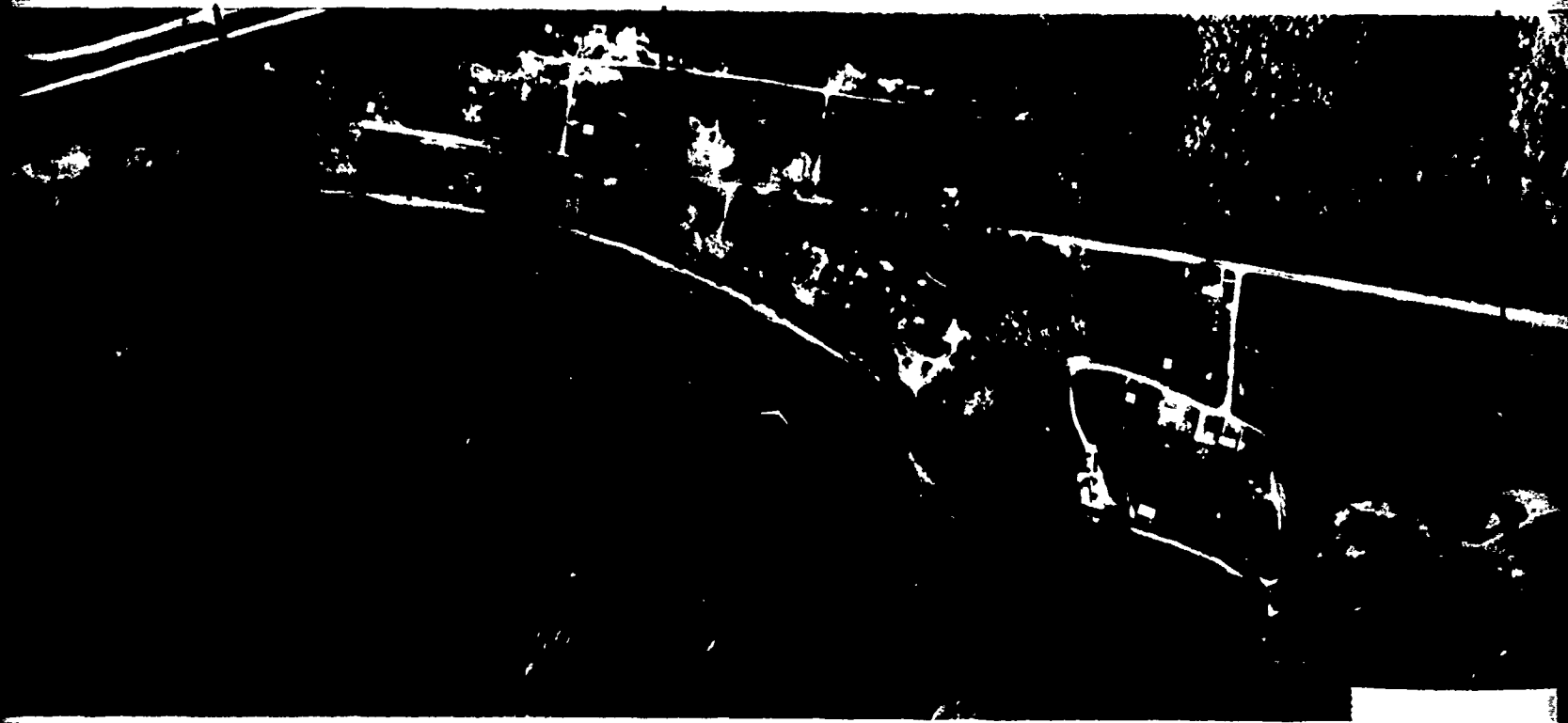
Variable	No. of Responses	Mean	Standard Error of Mean	Range		Adjusted Expanded Total for All Property Listings
				Minimum	Maximum	
Assessed Value (\$)	60	9000	800	800	33700	
Reported Market Value (\$)	41	20800	1	1500	45000	
Bluff Height (Ft.)	28	5	2	1	50	
Beach Depth (Ft.)	23	17	3	5	50	
Bluff Lost (Ft.)	22	16	4	1	50	
Beach Lost (Ft.)	34	36	4	10	100	
Damages Erosion (\$)	13	1650	500	150	5000	
Damages Flooding (\$)	9	900	300	100	2500	
Damages - Erosion and Flooding (\$)						67,000
Protective Structure Cost (\$)	12	800	200	100	1800	23,000
Total Damages (\$)	23	1700	350	100	6350	90,000

Total Identified Residential Properties: 119 Self-Administered Assessment Respondents: 60



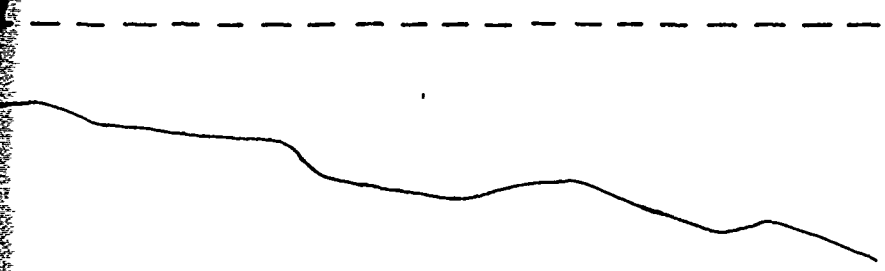
ALCONA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 10
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN





ALCONA PROFILE # 2

WATER LEVEL - JUNE 2, 1975



ALCONA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 11
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN

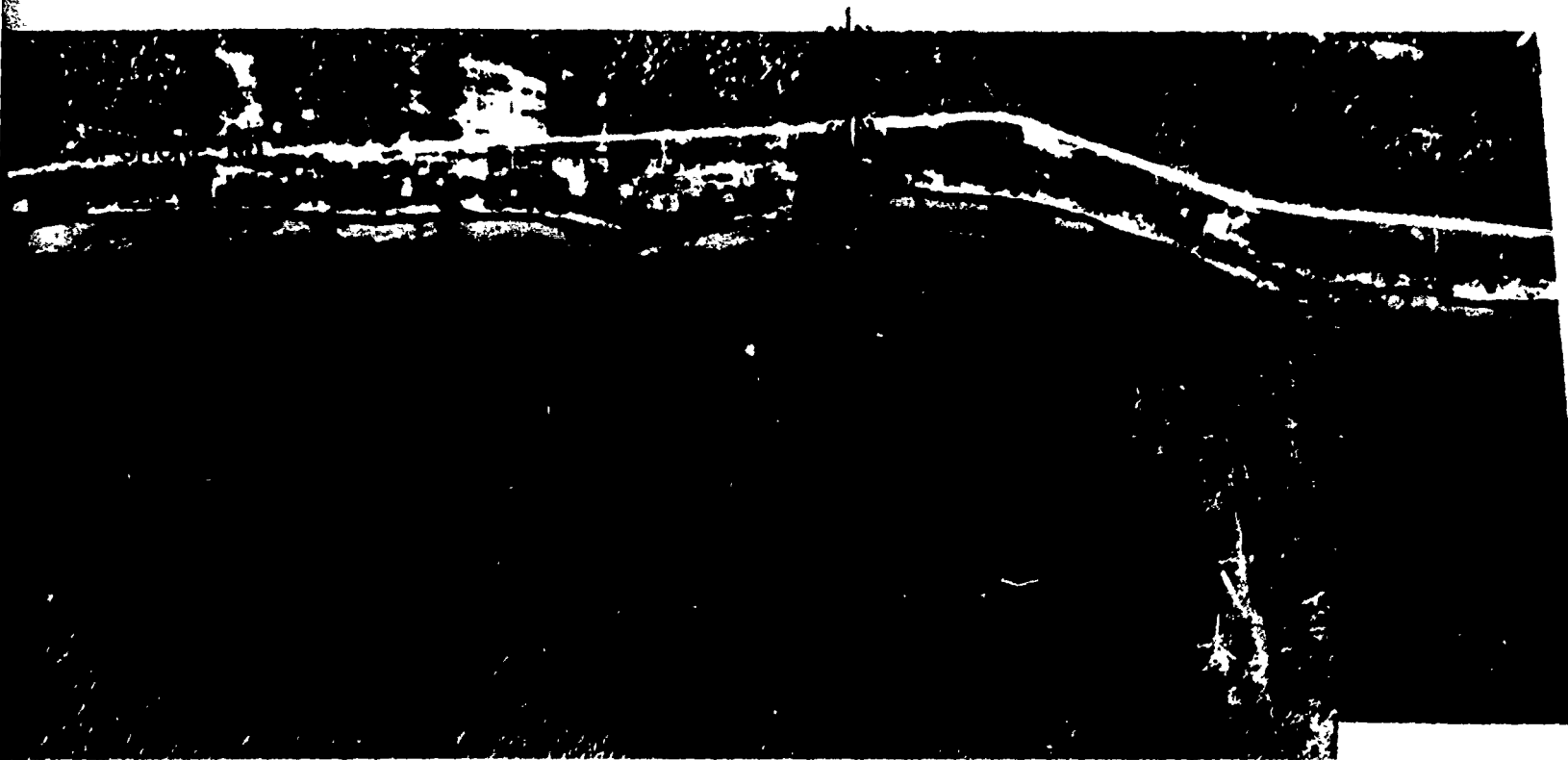
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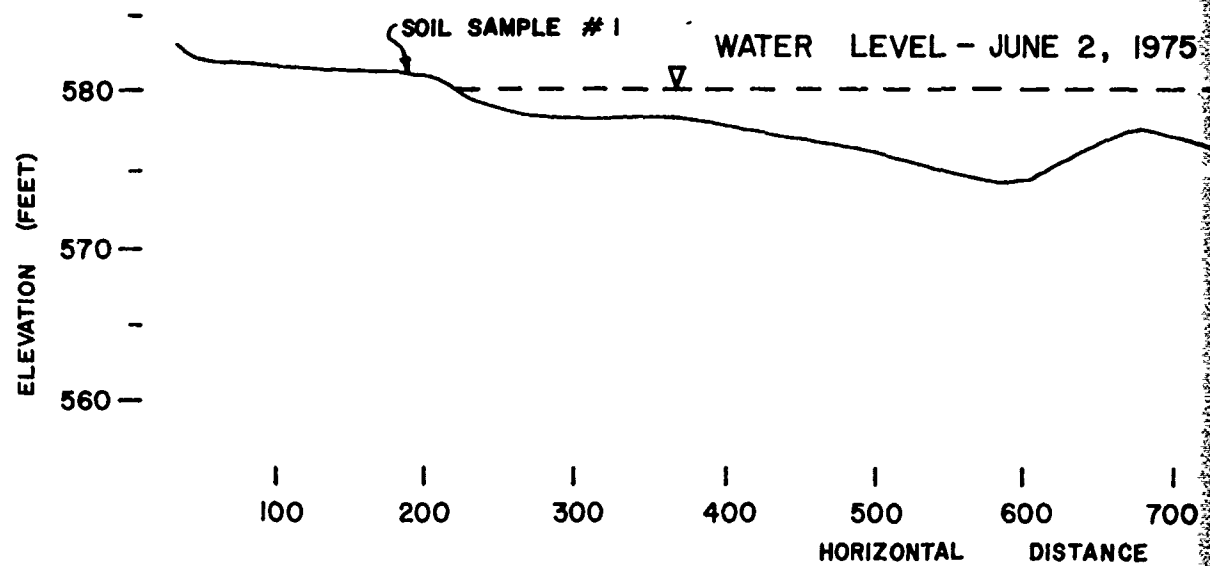
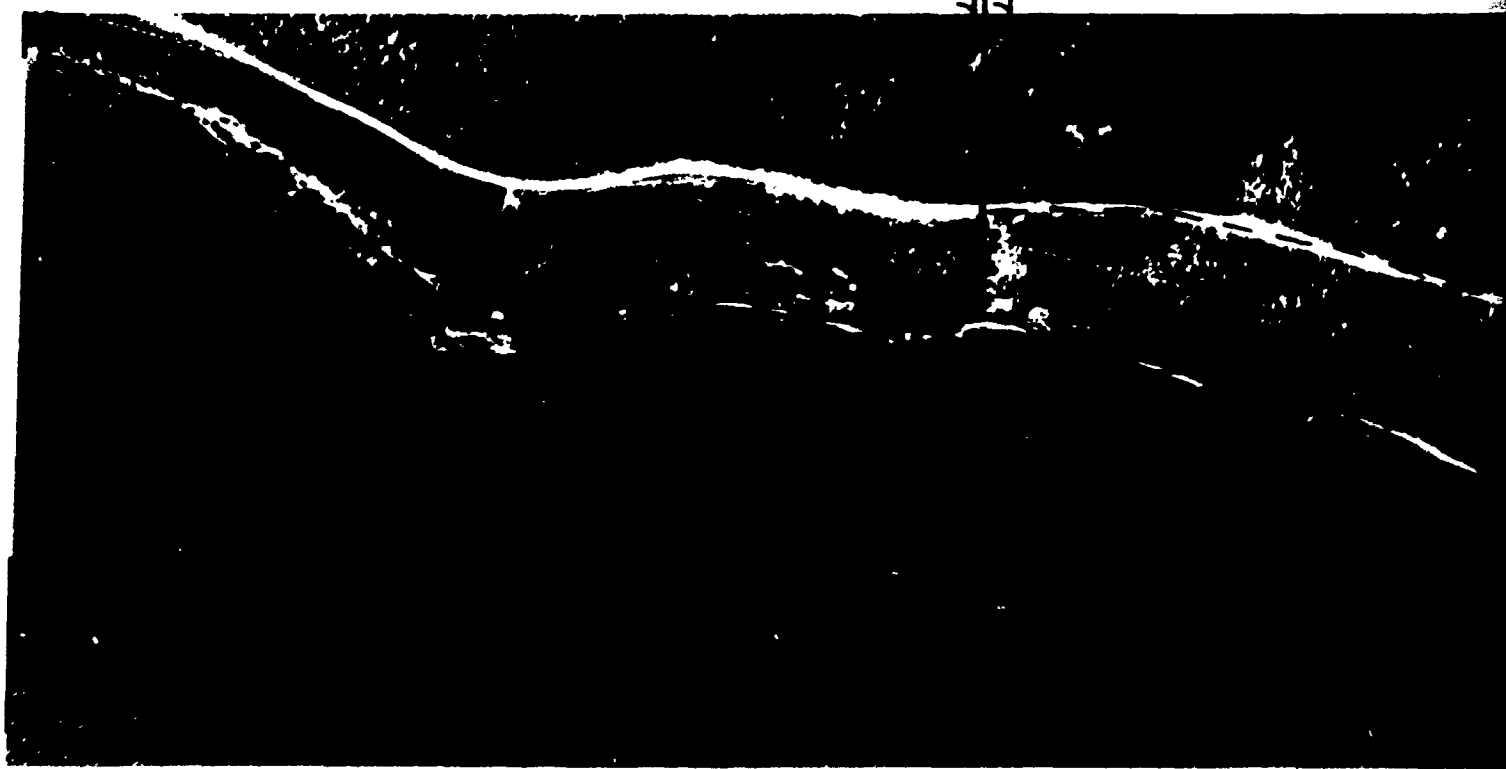
ALCONA COUNTY, MICHIGAN REACH #3

Variable	No. of Responses	Mean	Standard Error of Mean	Range		Adjusted Expanded Total for All Property Listings
				Minimum	Maximum	
Assessed Value (\$)	27	10000	1500	2100	31200	
Reported Market Value (\$)	20	22400	5100	4000	85000	
Bluff Height (Ft.)	8	3	1	1	7	
Beach Depth (Ft.)	6	69	45	3	290	
Bluff Lost (Ft.)	6	30	11	2	75	
Beach Lost (Ft.)	8	45	8	20	80	
Damages Erosion (\$)	7	1700	700	400	4500	
Damages Flooding (\$)	7	1050	400	100	3200	
Damages - Erosion and Flooding (\$)						56,000
Protective Structure Cost (\$)	8	5650	3500	500	29000	100,000
Total Damages (\$)	10	6450	3050	100	32200	156,000

Total Identified Residential Properties: 78 Self-Administered Assessment Respondents: 25



ALCONA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 12
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN



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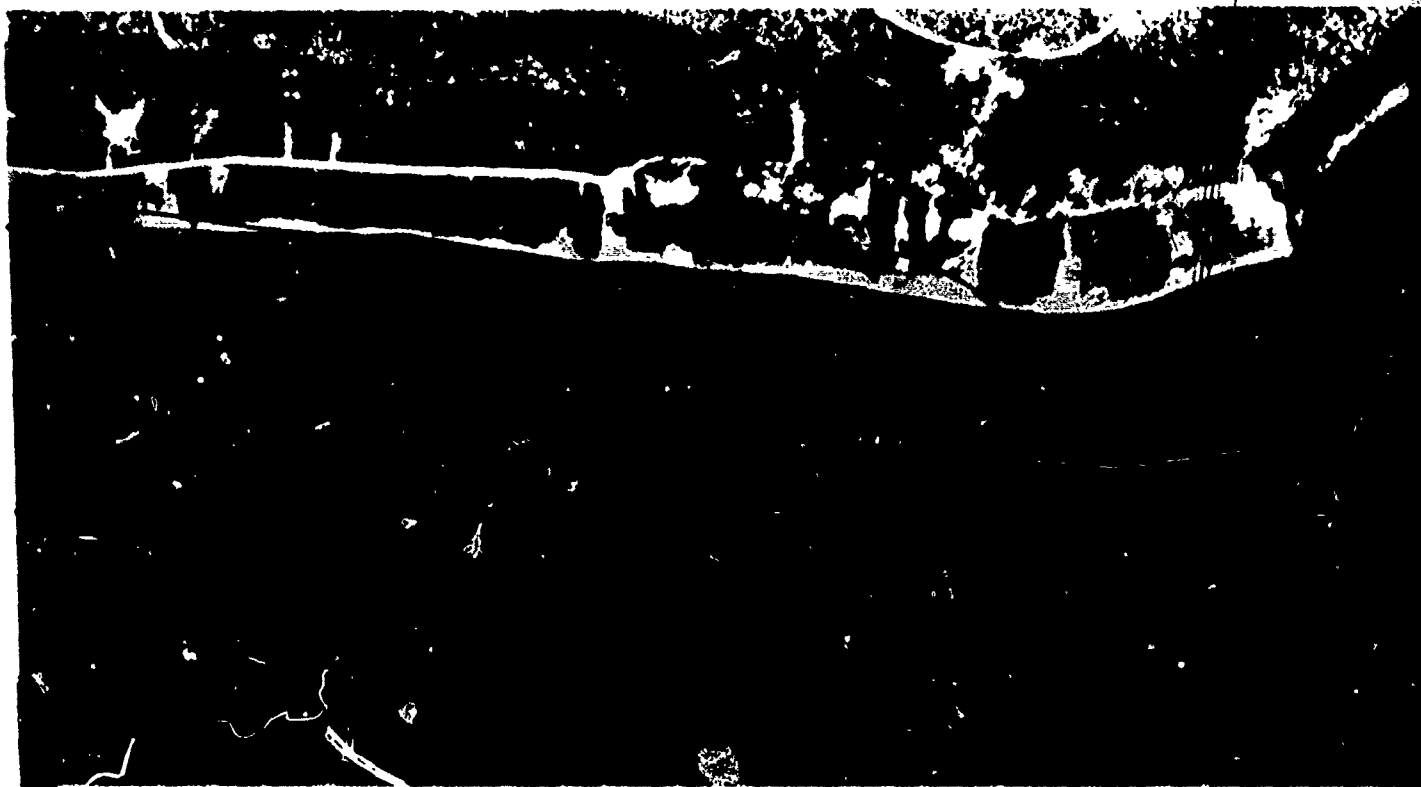
E 2, 1975

ALCONA PROFILE # 3



ALCONA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 13
SCALE: 1" = 300'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN

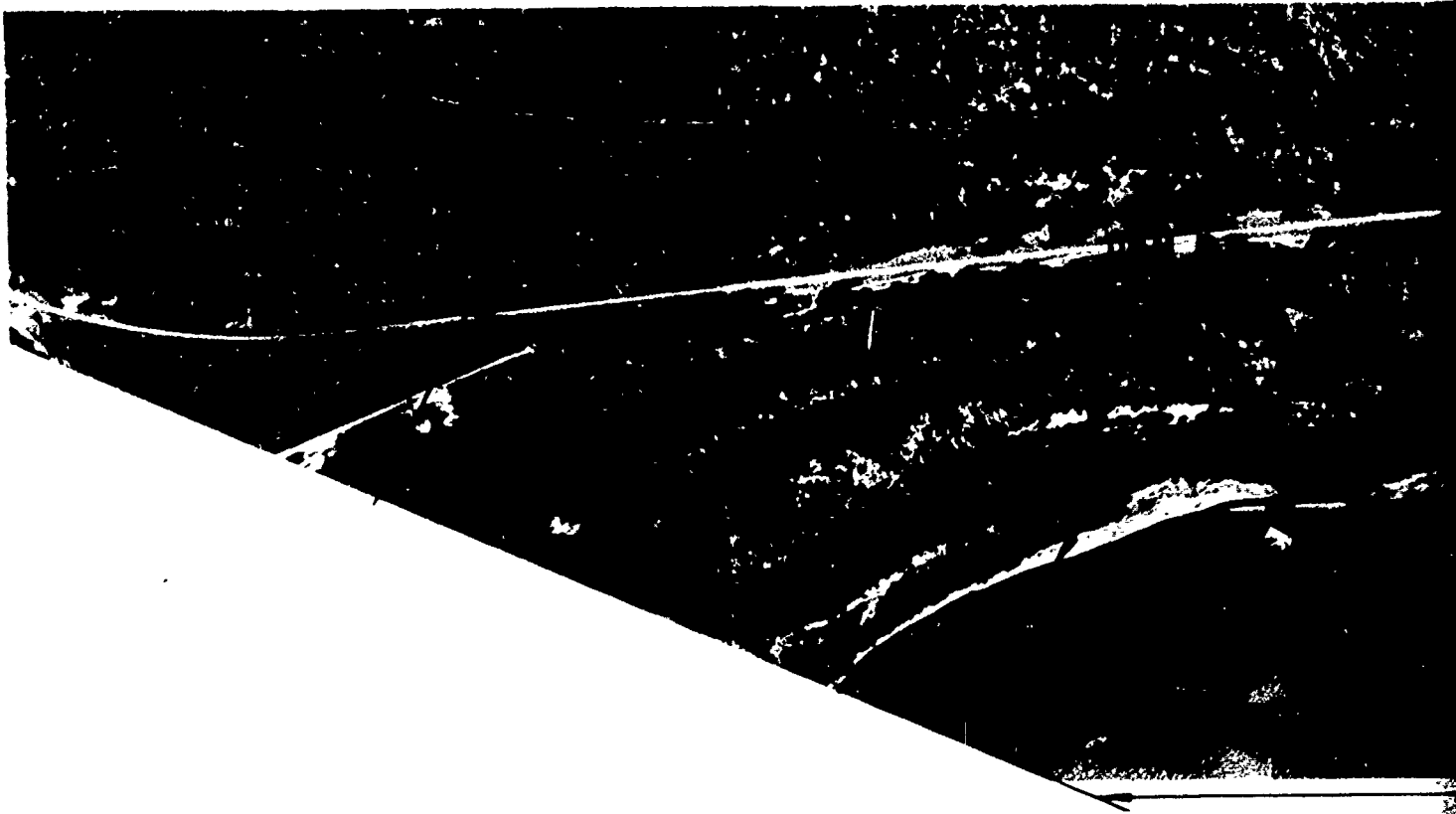
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DISTANCE (FEET)



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ALCONA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 14
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN



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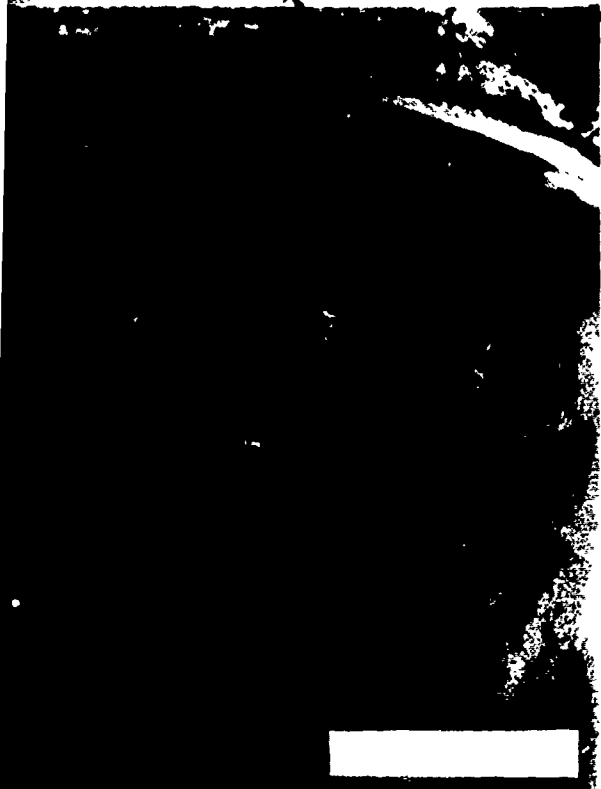


ALCONA COUNTY
PILCT DAMAGE STUDY, 1975
PLATE NO. 15
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN



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ALCONA COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 16
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN



HURON COUNTY, MICHIGAN REACH #1

Variable	No. of Responses	Mean	Standard Error of Mean	Range		Adjusted Expanded Total for All Property Listings
				Minimum	Maximum	
Assessed Value (\$)	73	9000	5900	400	36000	
Reported Market Value (\$)	54	35700	36500	2200	250000	
Bluff Height (Ft.)	43	8	6	1	30	
Beach Depth (Ft.)	32	26	31	1	150	
Bluff Lost (Ft.)	31	21	25	1	99	
Beach Lost (Ft.)	43	48	53	10	300	
Damages Erosion (\$)	23	3650	3550	100	13000	
Damages Flooding (\$)	21	2650	2650	200	9700	
Damages - Erosion and Flooding (\$)						1,060,000
Protective Structure Cost (\$)	29	5000	8100	100	4200	1,200,000
Total Damages (\$)	42	6750	9200	100	51200	2,260,000

Number of Self-Administered Assessments Mailed: 118

Total Identified Residential Properties: 623 Self-Administered Assessment Respondents: 78



HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 1
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN



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HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 2
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN



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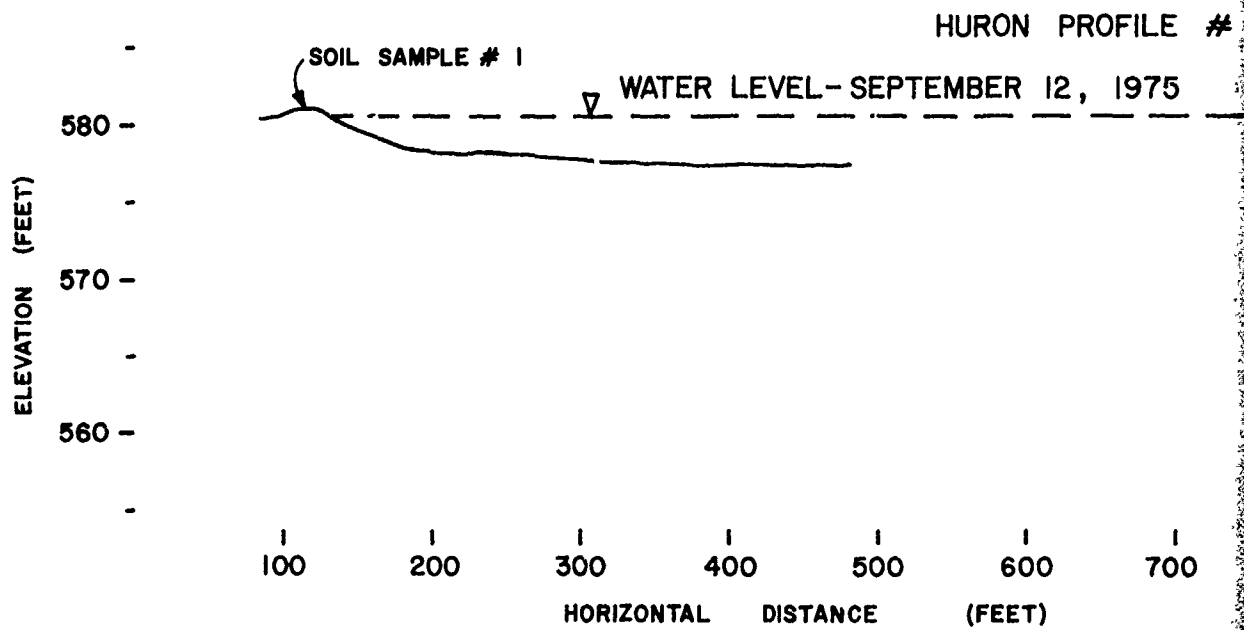
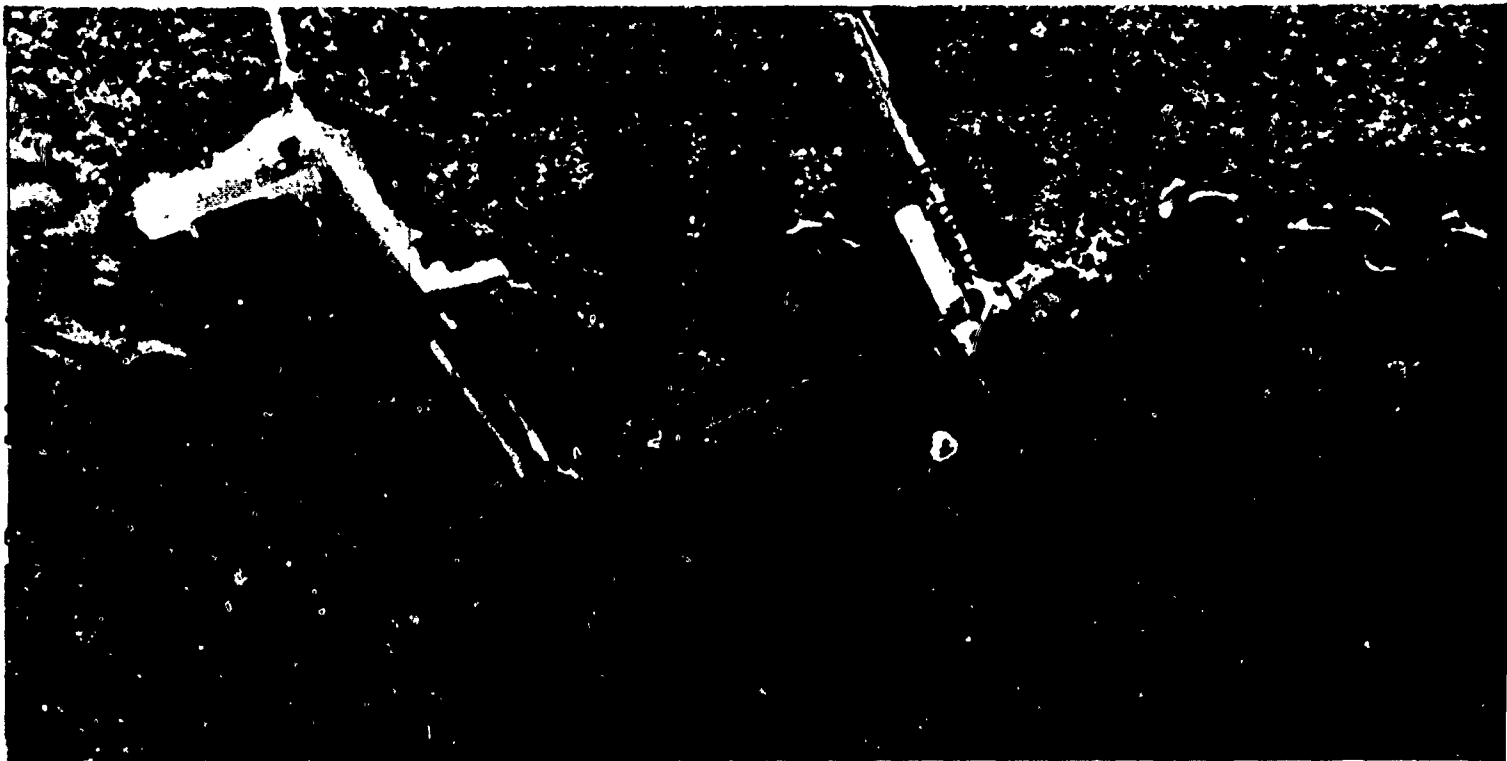
HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 3
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN

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HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 4
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN



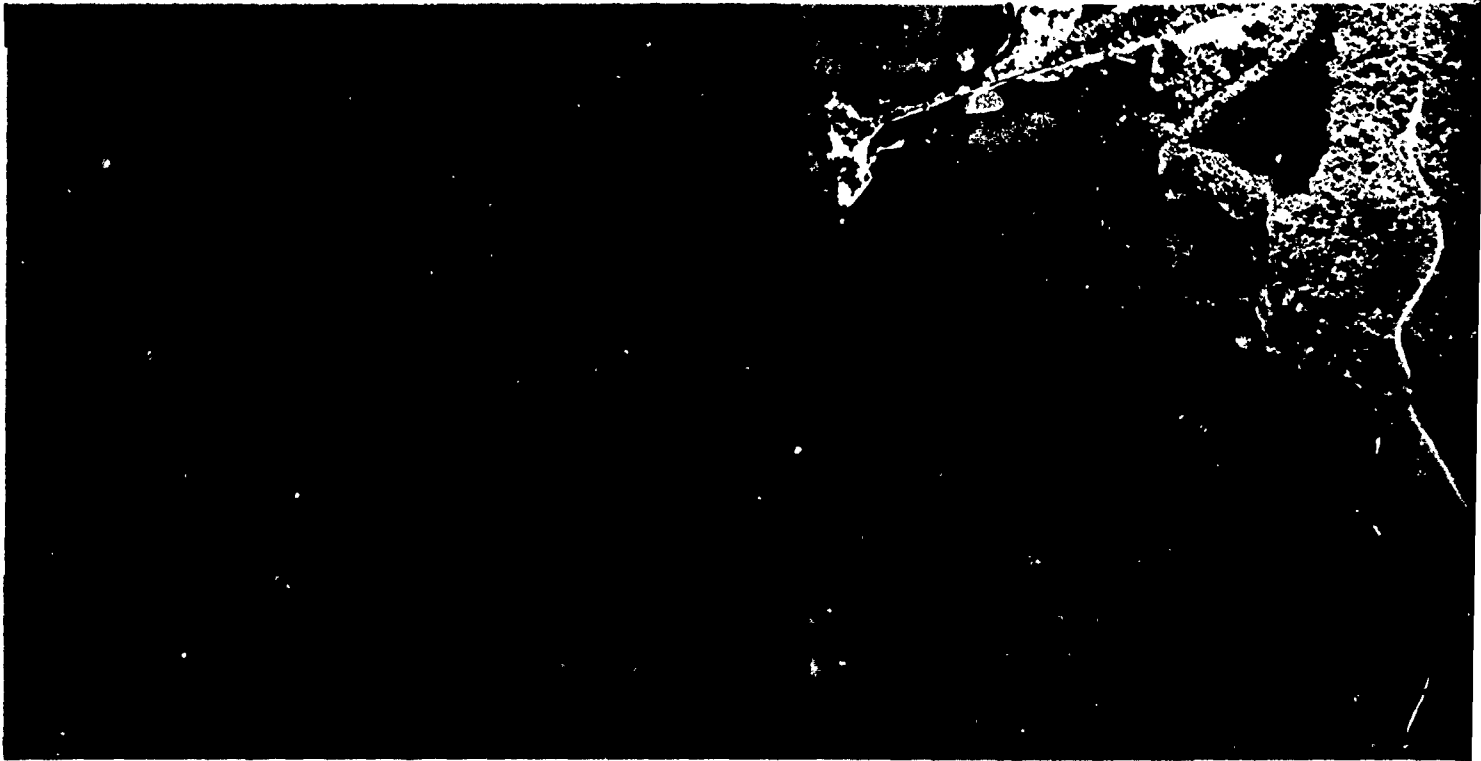


PROFILE # 6

1975

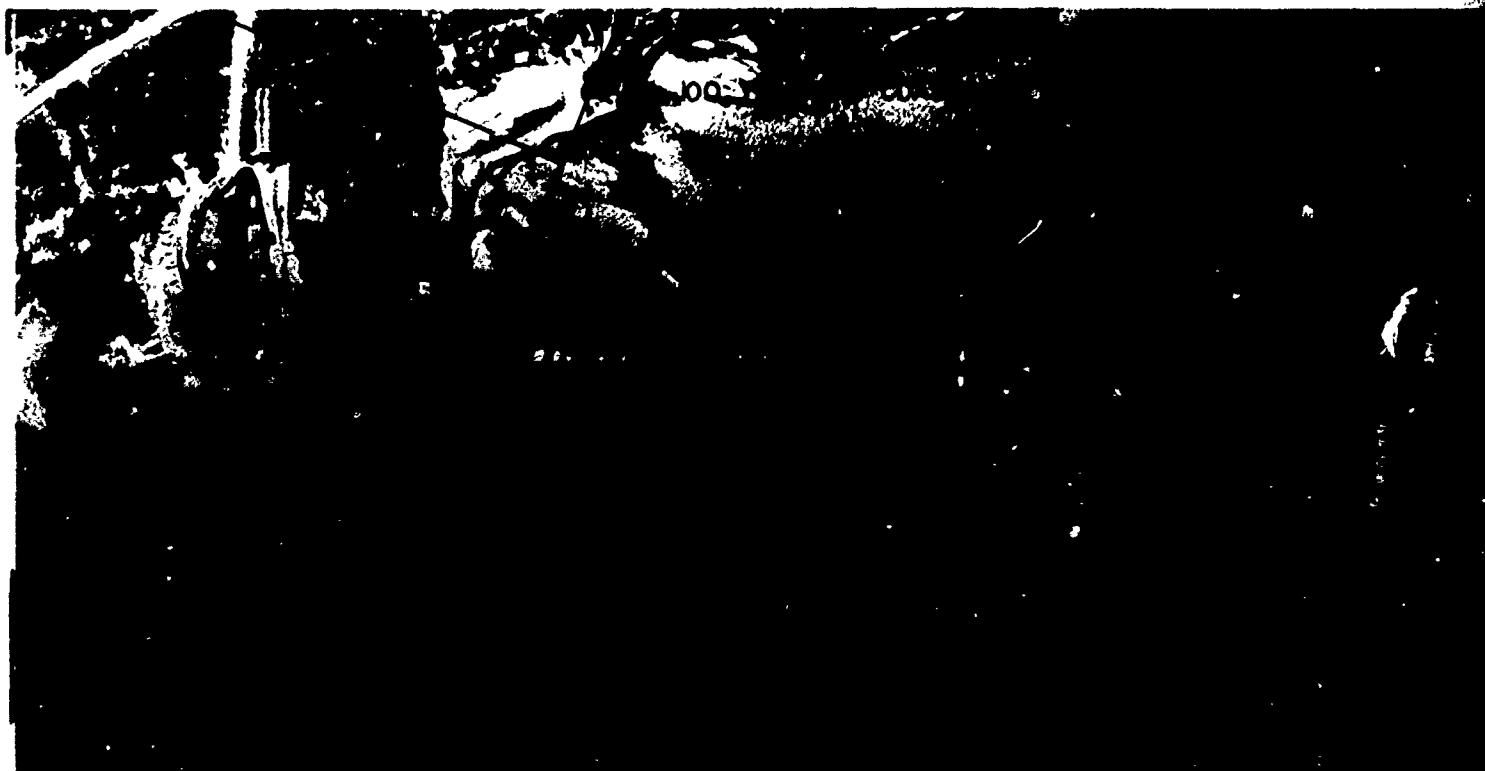
HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 5
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN

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HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 6
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN

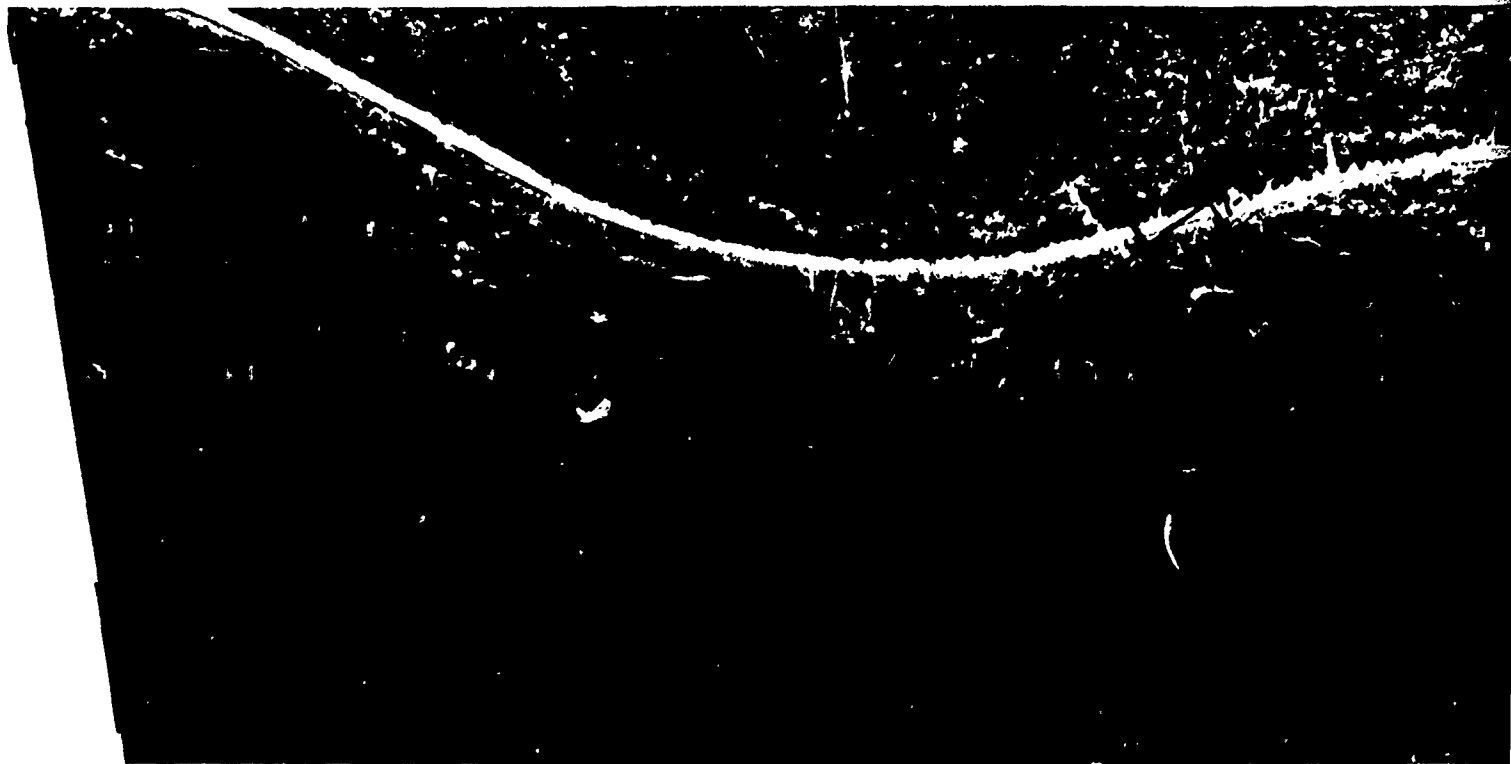


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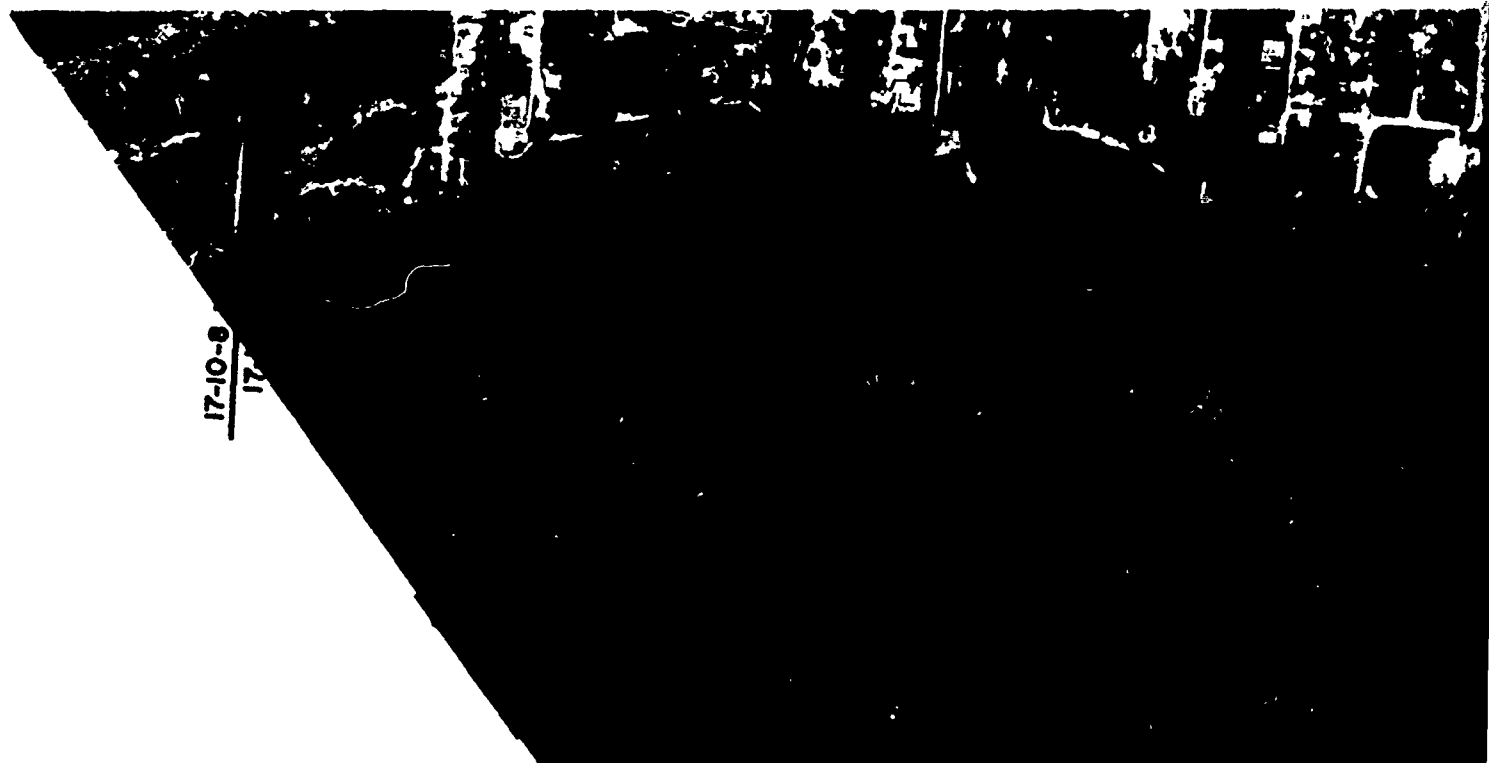


HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 7
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN





HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 8
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN



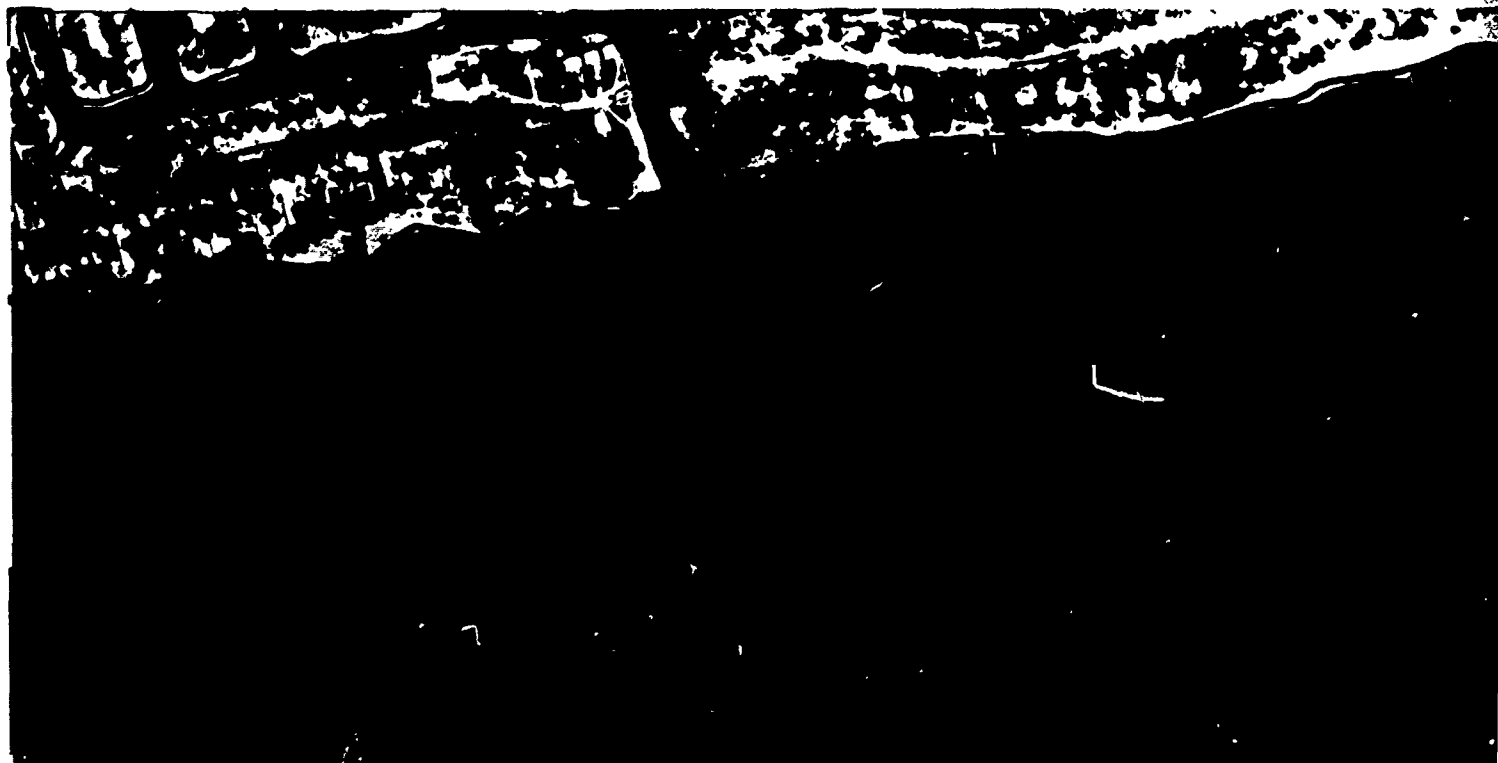
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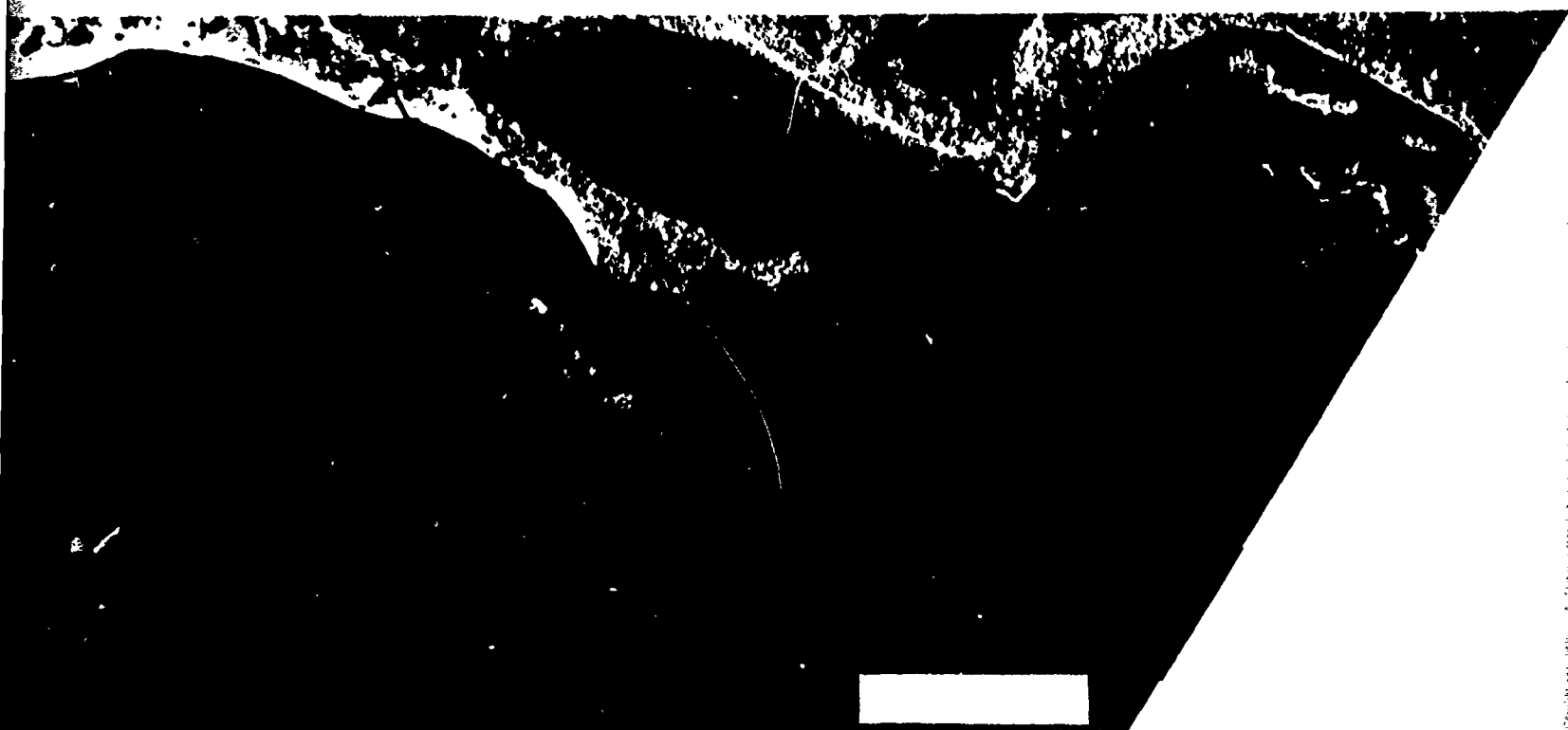


HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 9
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN

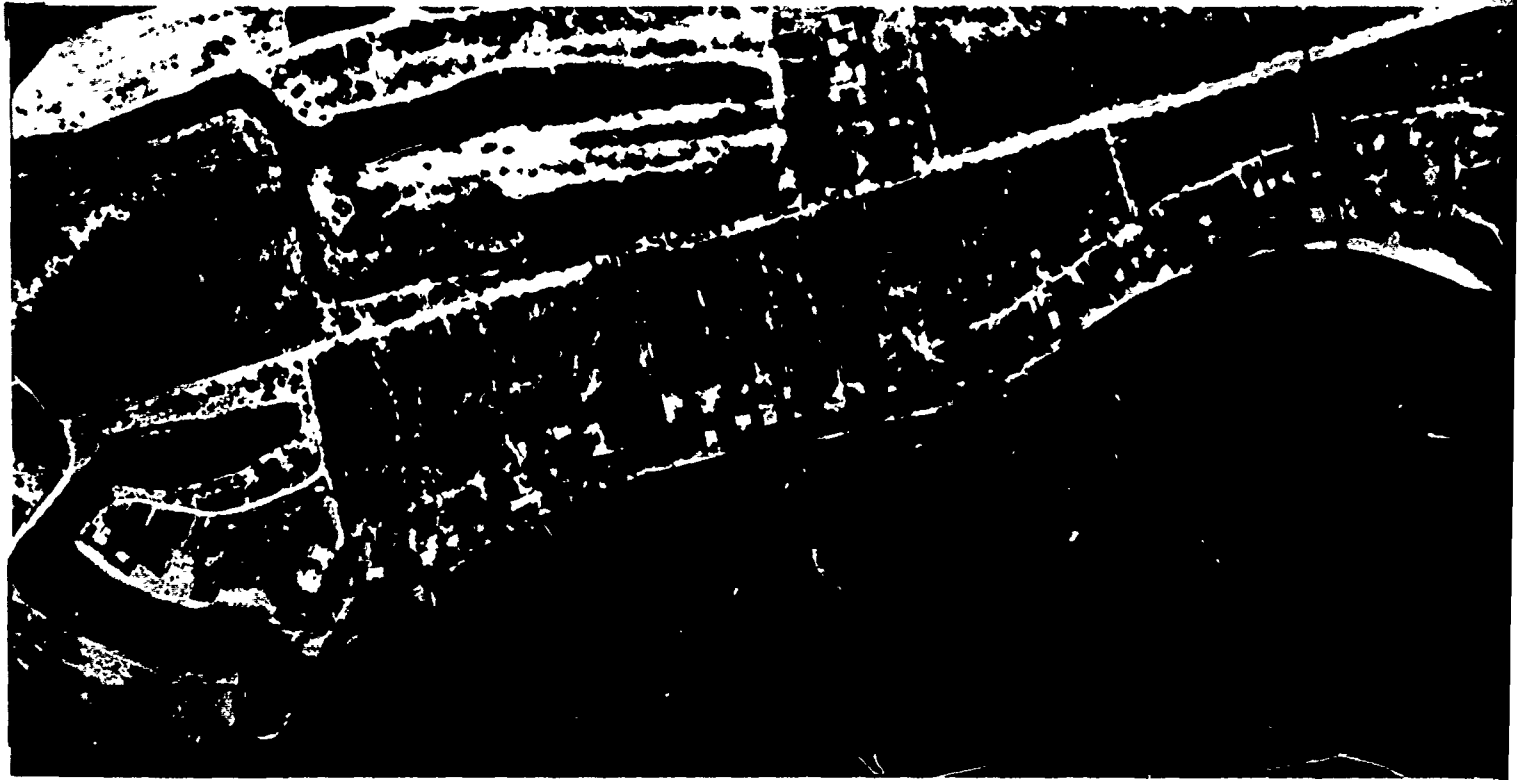
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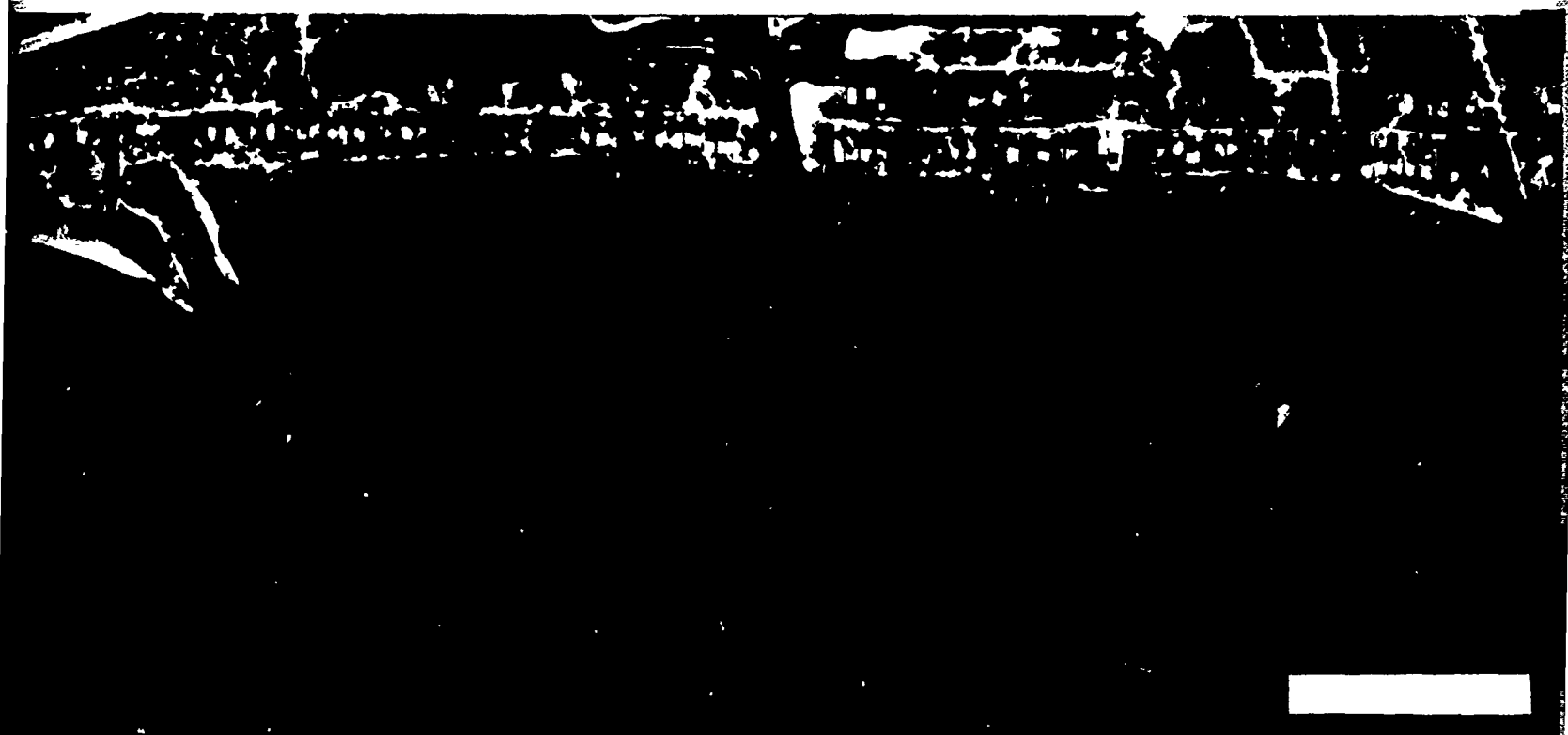


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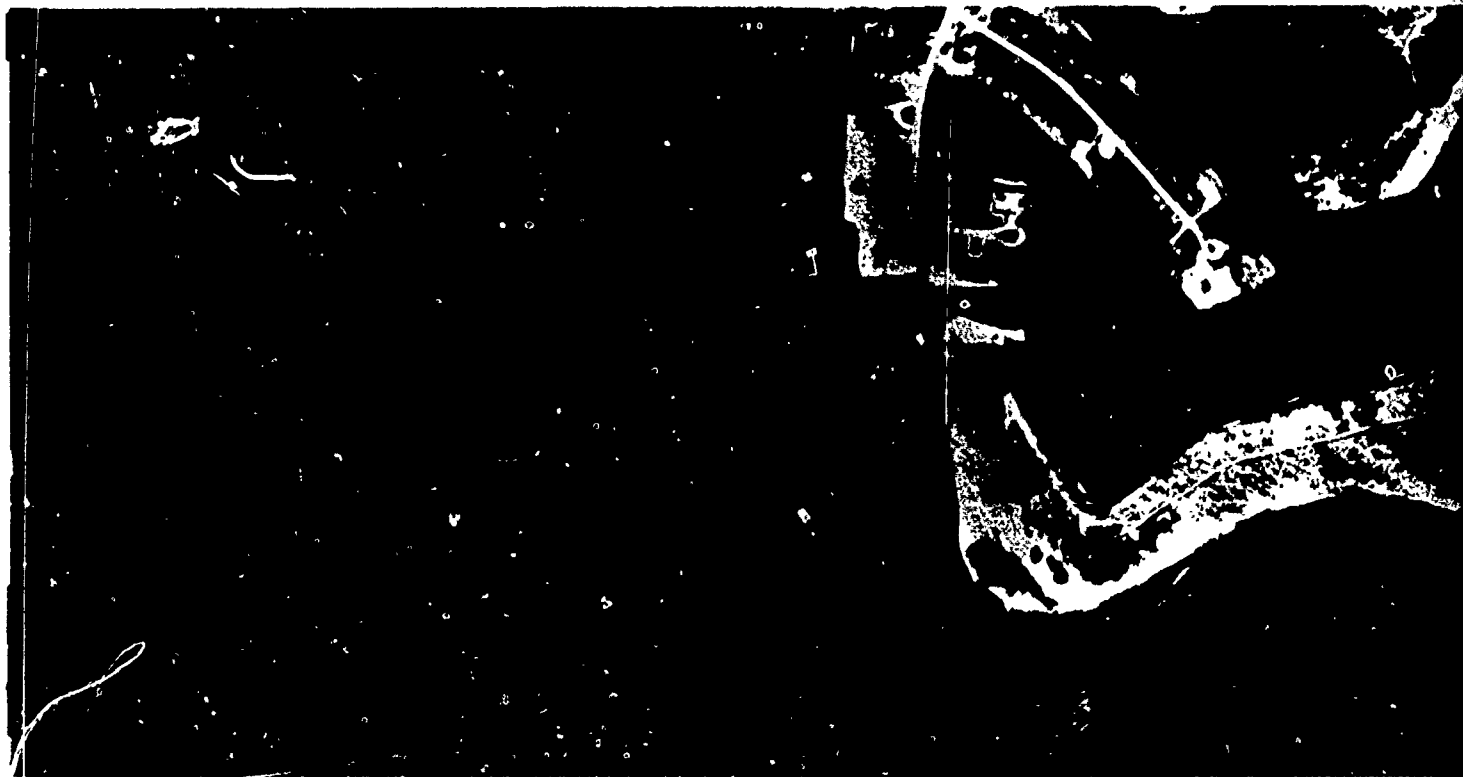


HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 10
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN



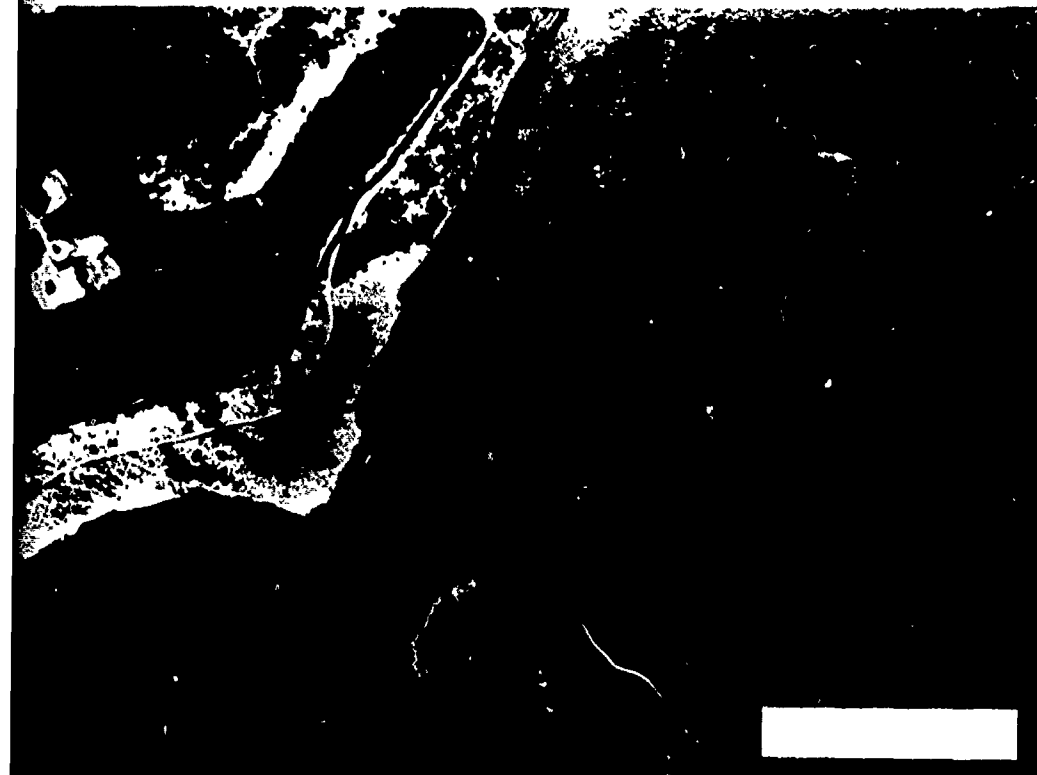


HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 11
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN



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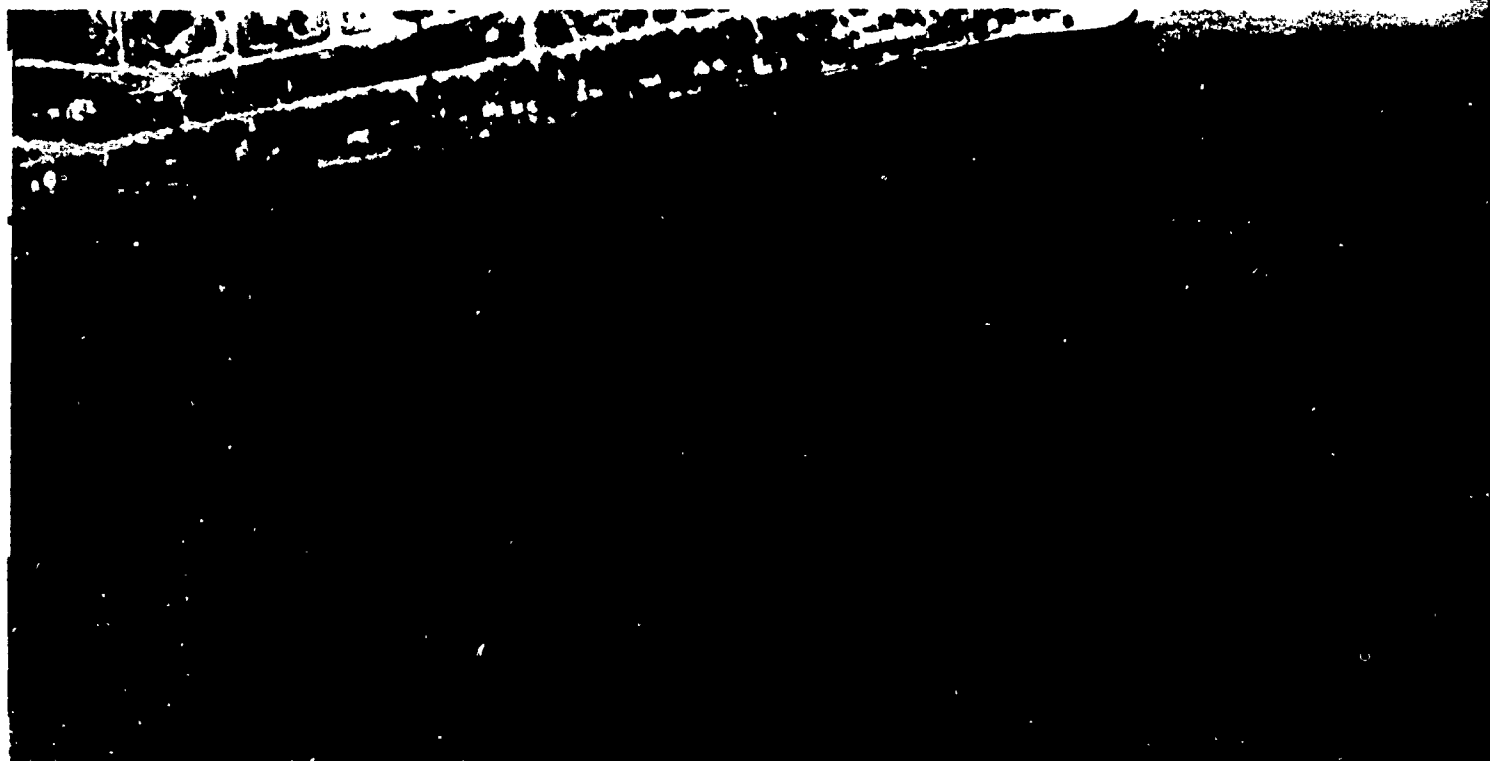
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HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 12
SCALE: 1' = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN

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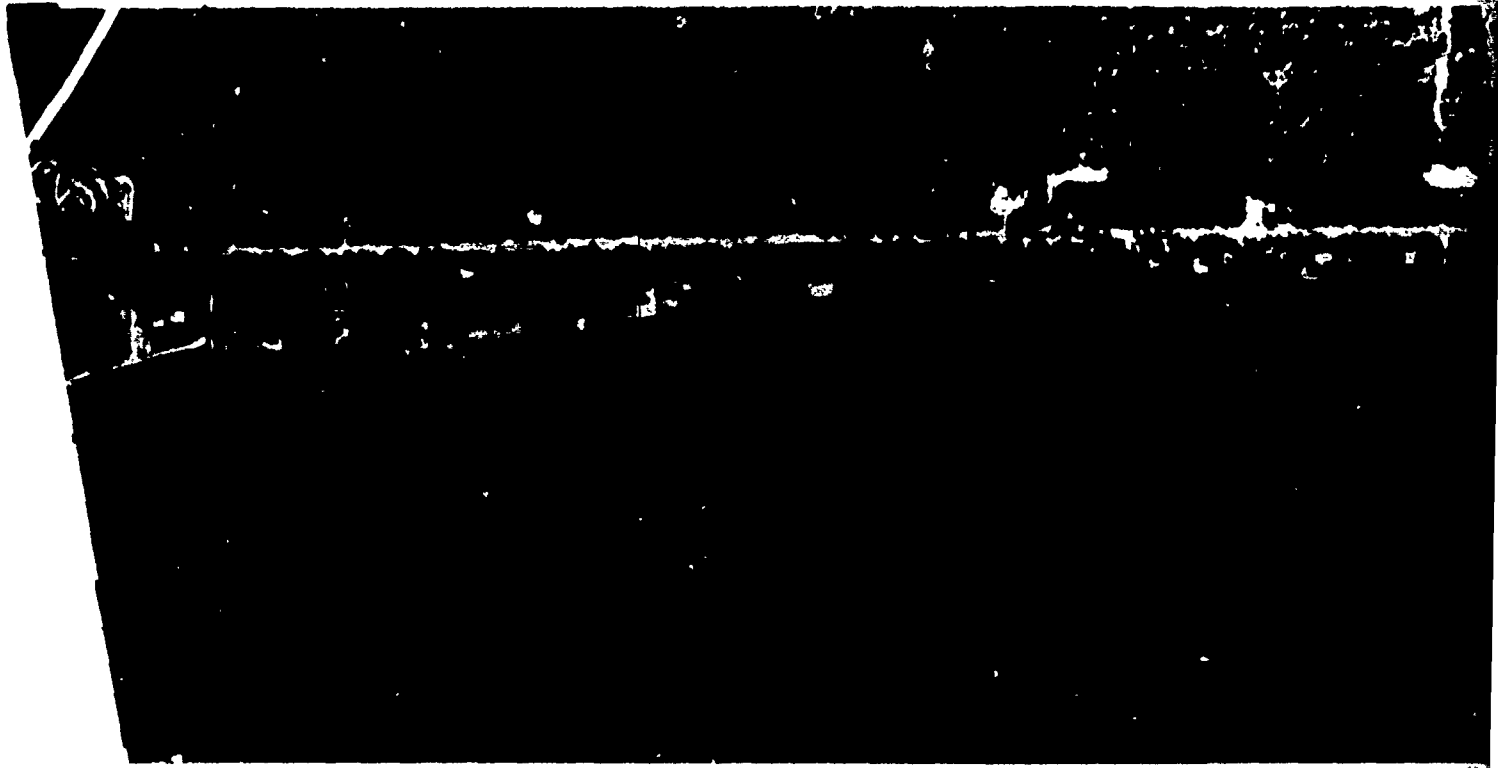
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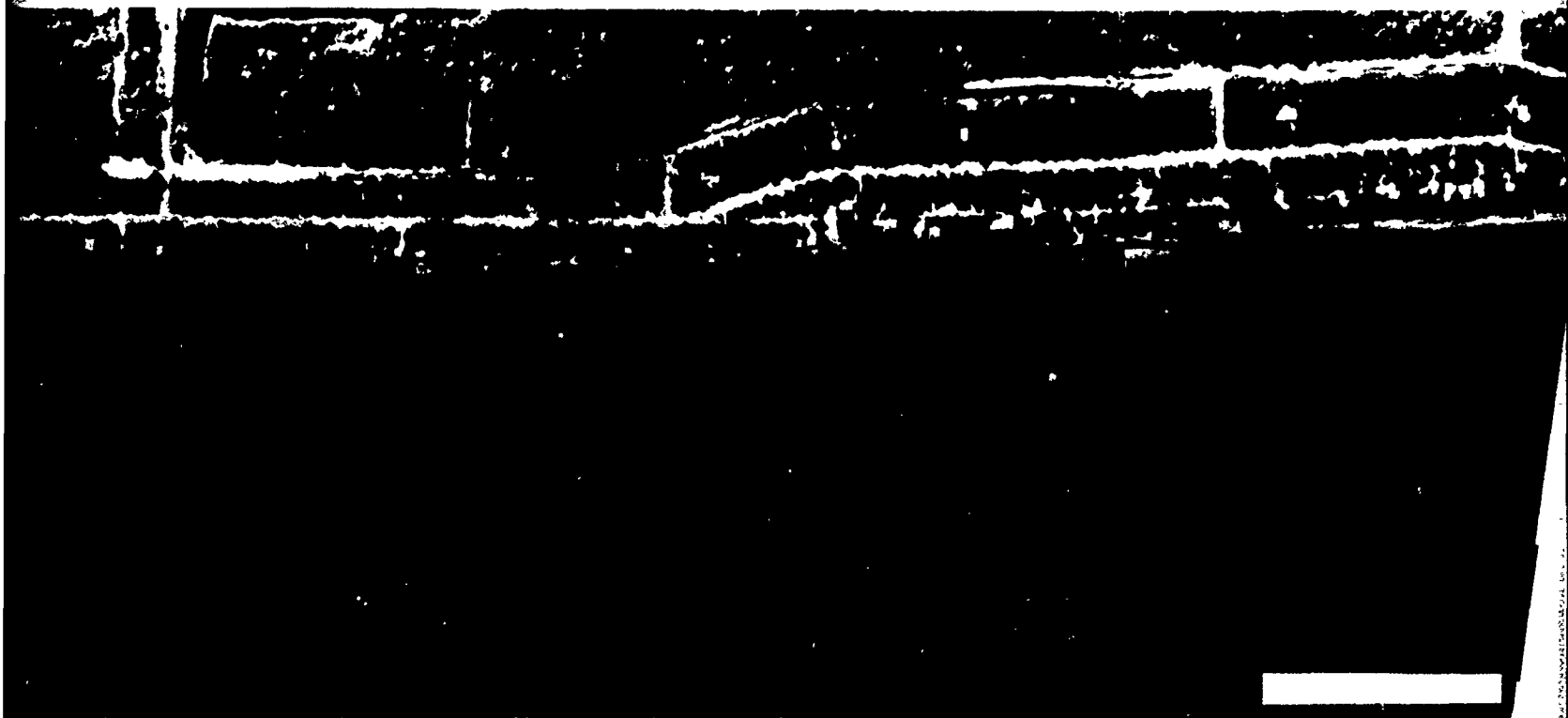


HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 13
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN

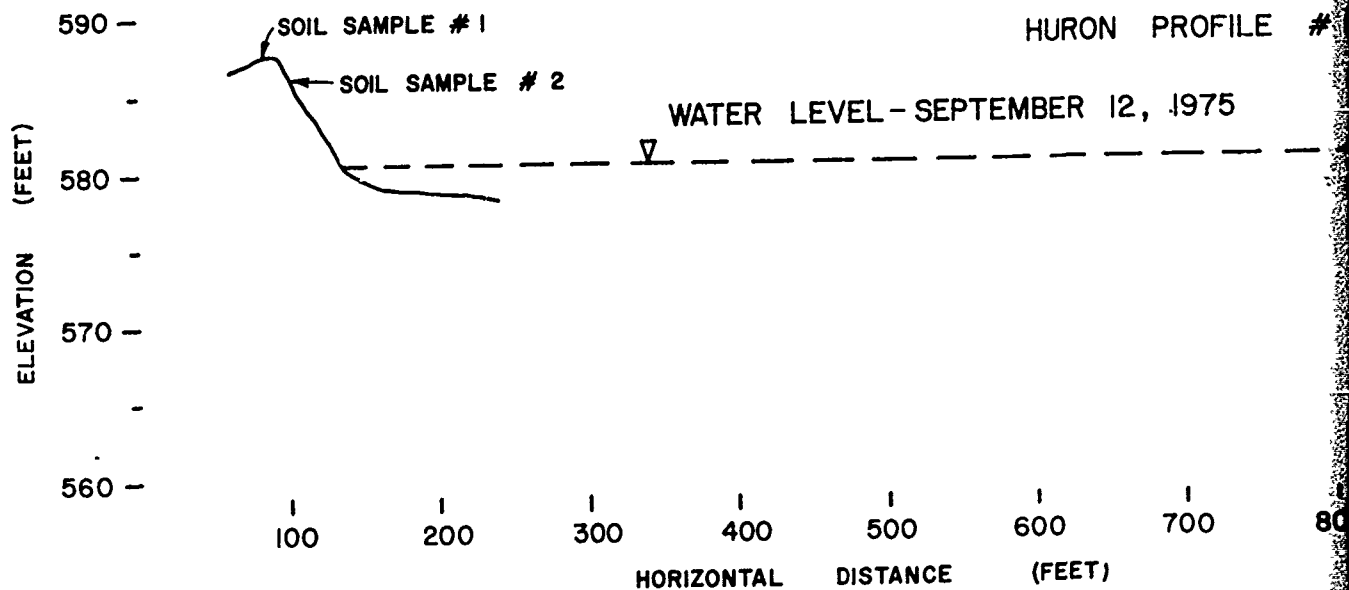
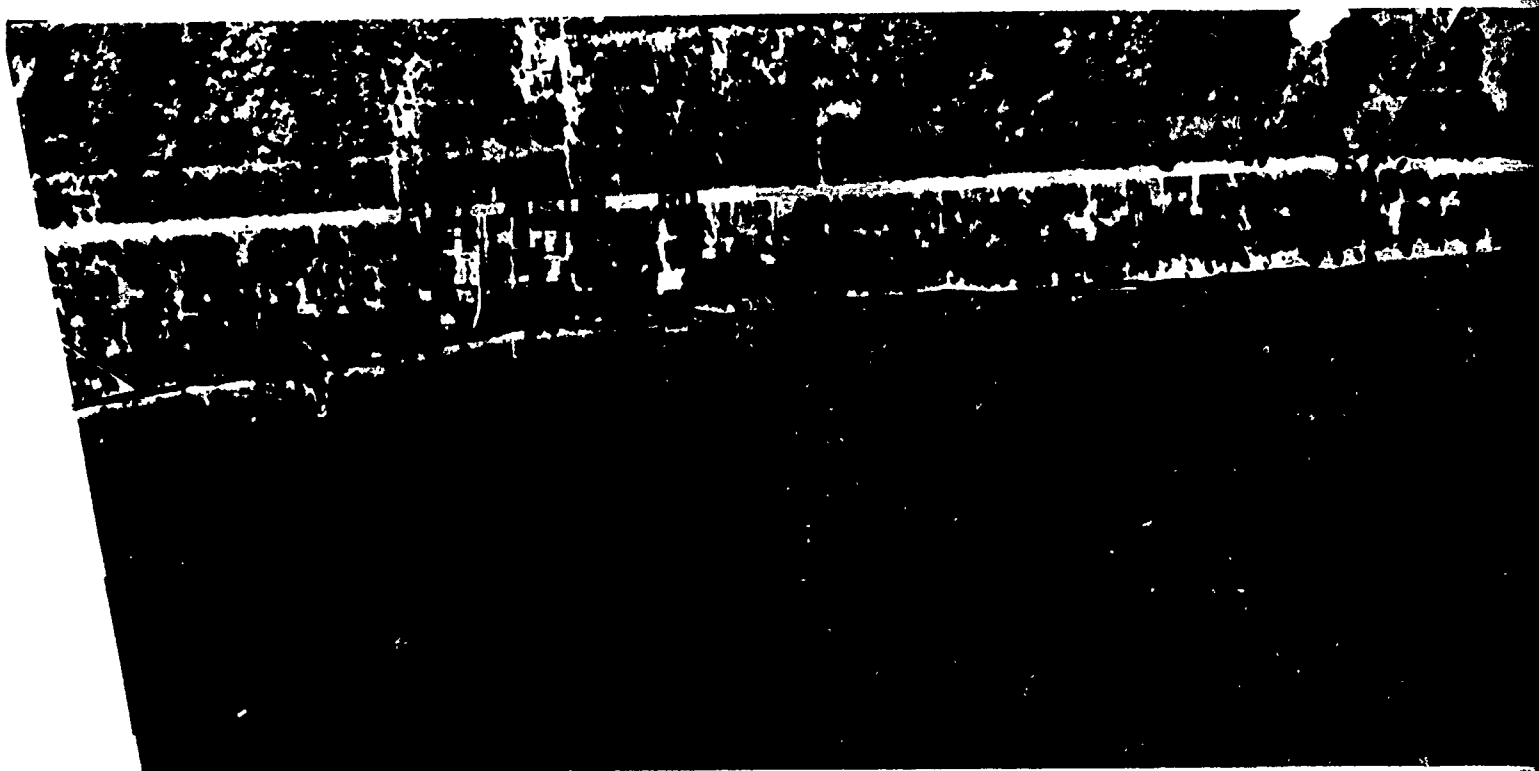
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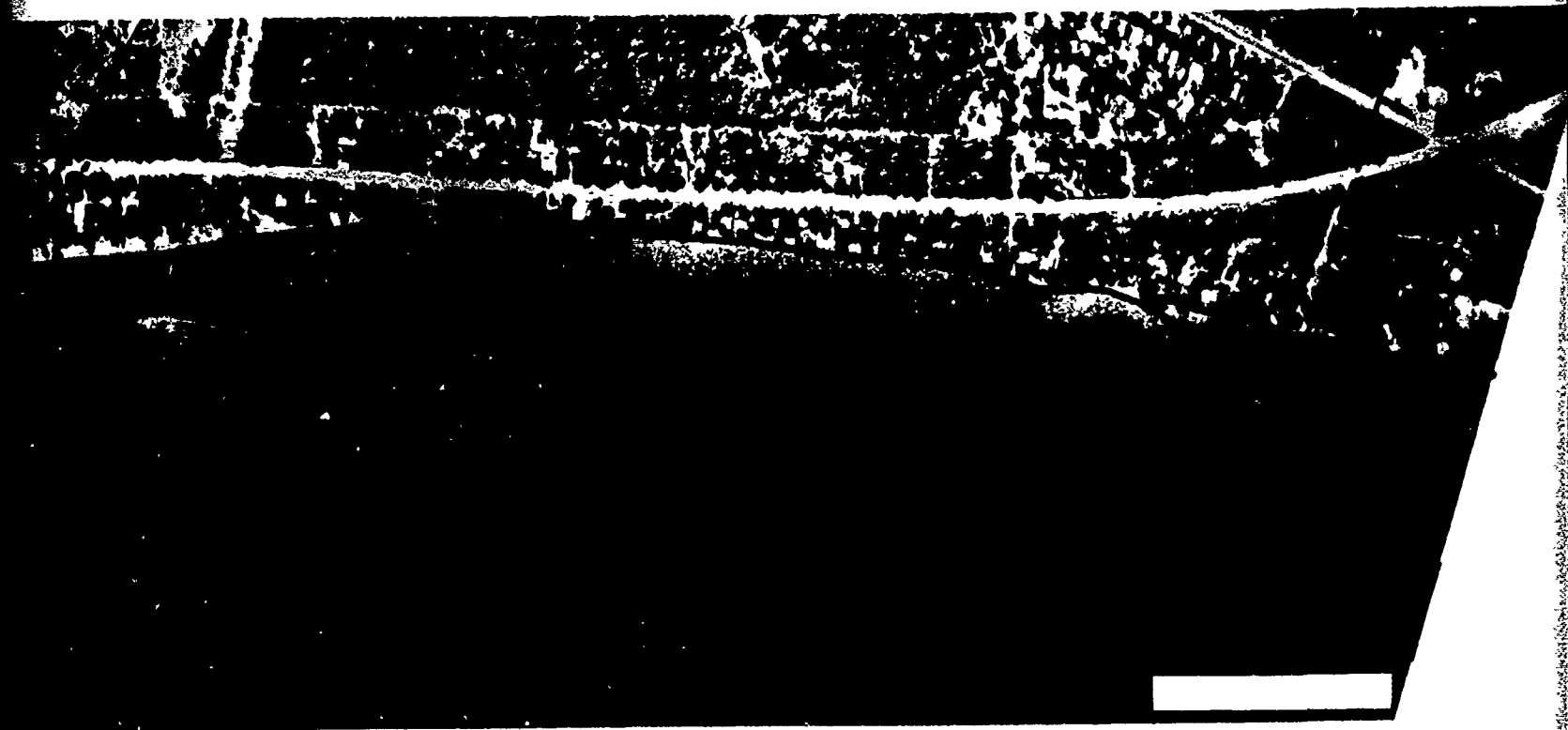


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HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 14
SCALE: 1' = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN





PROFILE # 5

, 1975

HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 15
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN

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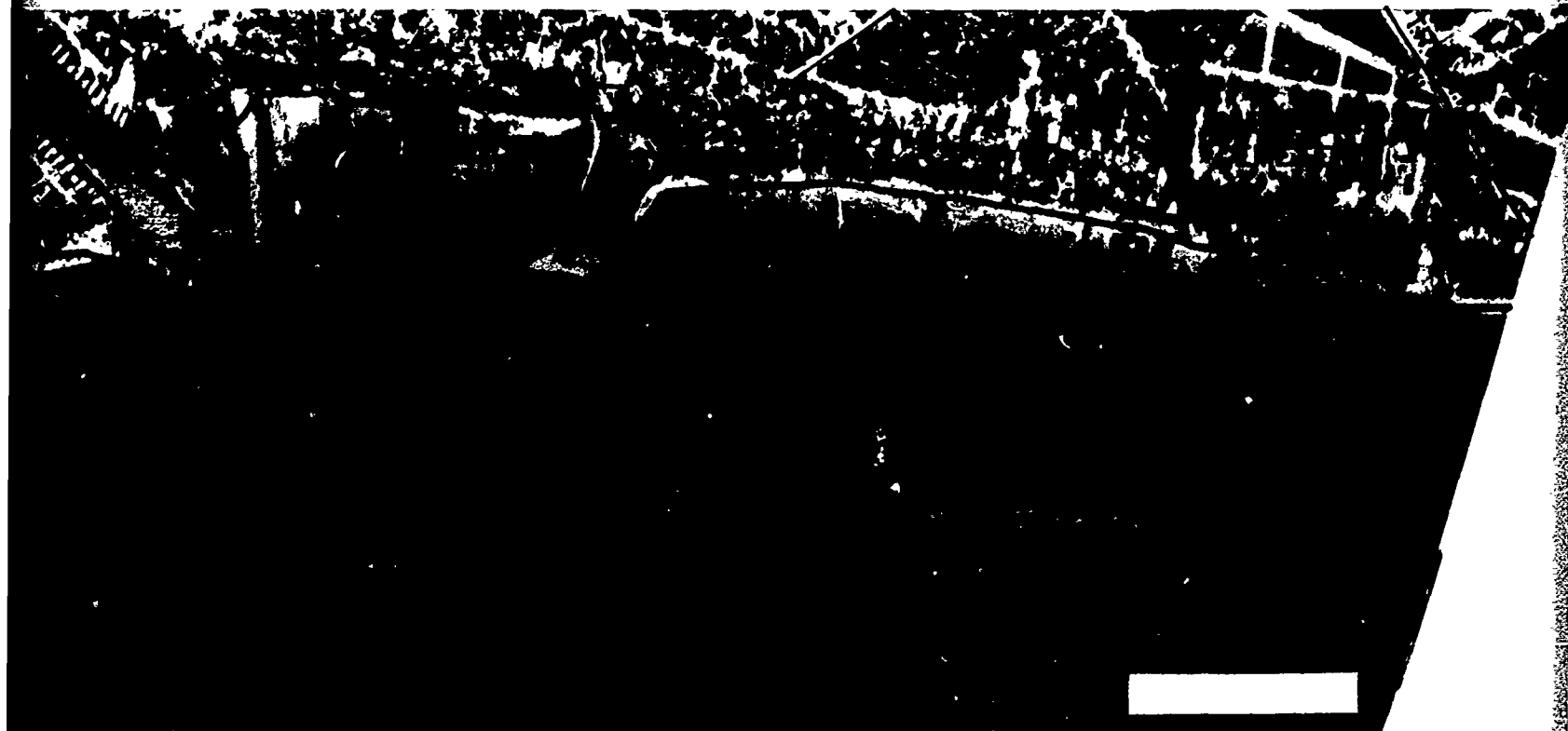


HURON COUNTY, MICHIGAN REACH #2

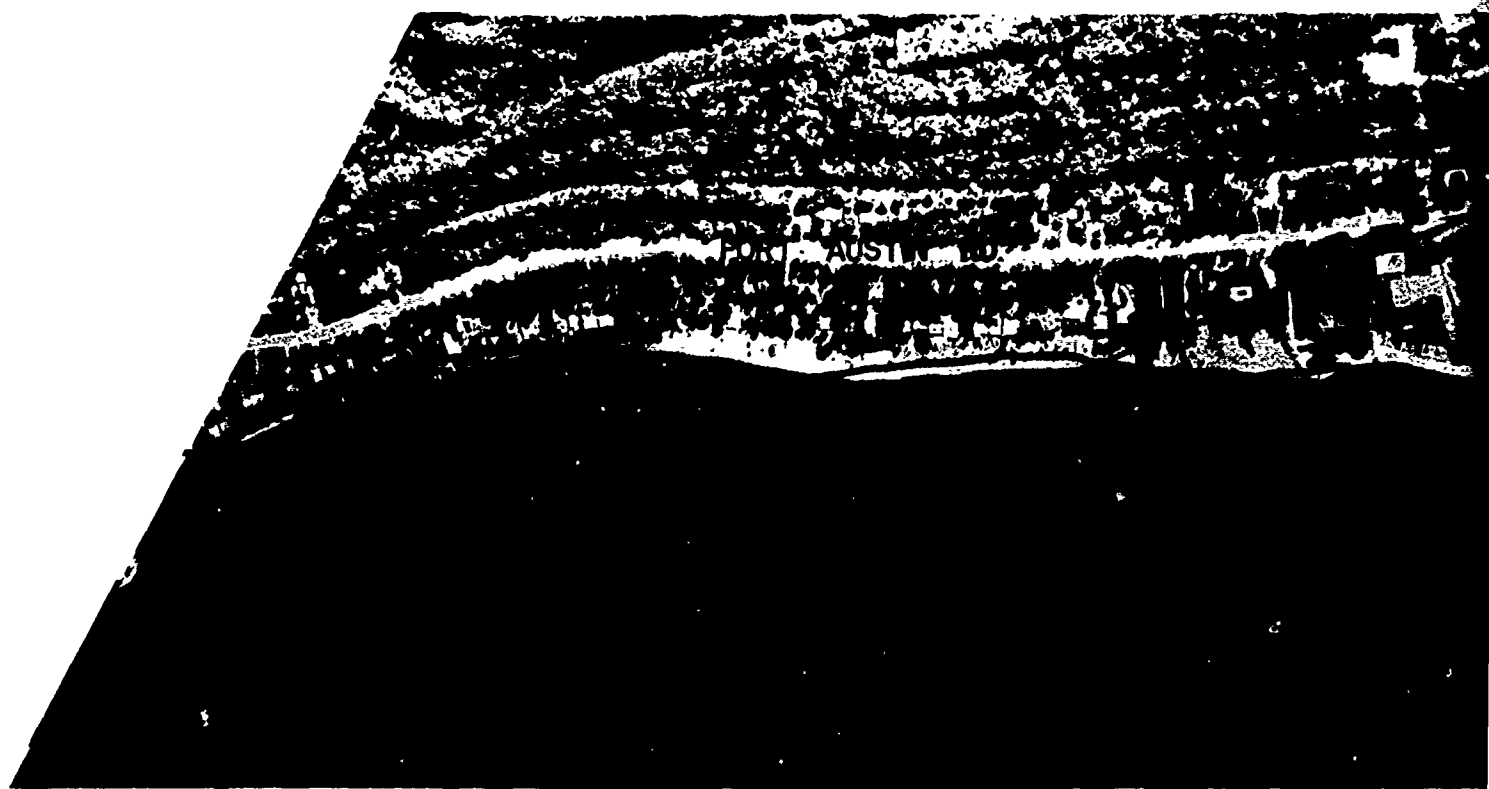
Variable	No. of Responses	Mean	Standard Error of Mean	Range		Adjusted Expanded Total for All Property Listings
				Minimum	Maximum	
Assessed Value (\$)	26	7700	4700	300	2000	
Reported Market Value (\$)	19	27300	15900	8600	65000	
Bluff Height (Ft.)	20	8	8	2	30	
Beach Depth (Ft.)	14	41	50	1	180	
Bluff Lost (Ft.)	17	34	30	3	99	
Beach Lost (Ft.)	17	47	55	10	190	
Damages Erosion (\$)	9	3100	2850	600	10000	
Damages Flooding (\$)	4	5050	8000	750	17000	
Damages - Erosion and Flooding (\$)						454,000
Protective Structure Cost (\$)	10	3550	4900	500	16550	382,000
Total Damages (\$)	15	5550	5600	800	18050	836,000

Number of Self-Administered Assessments Mailed: 42

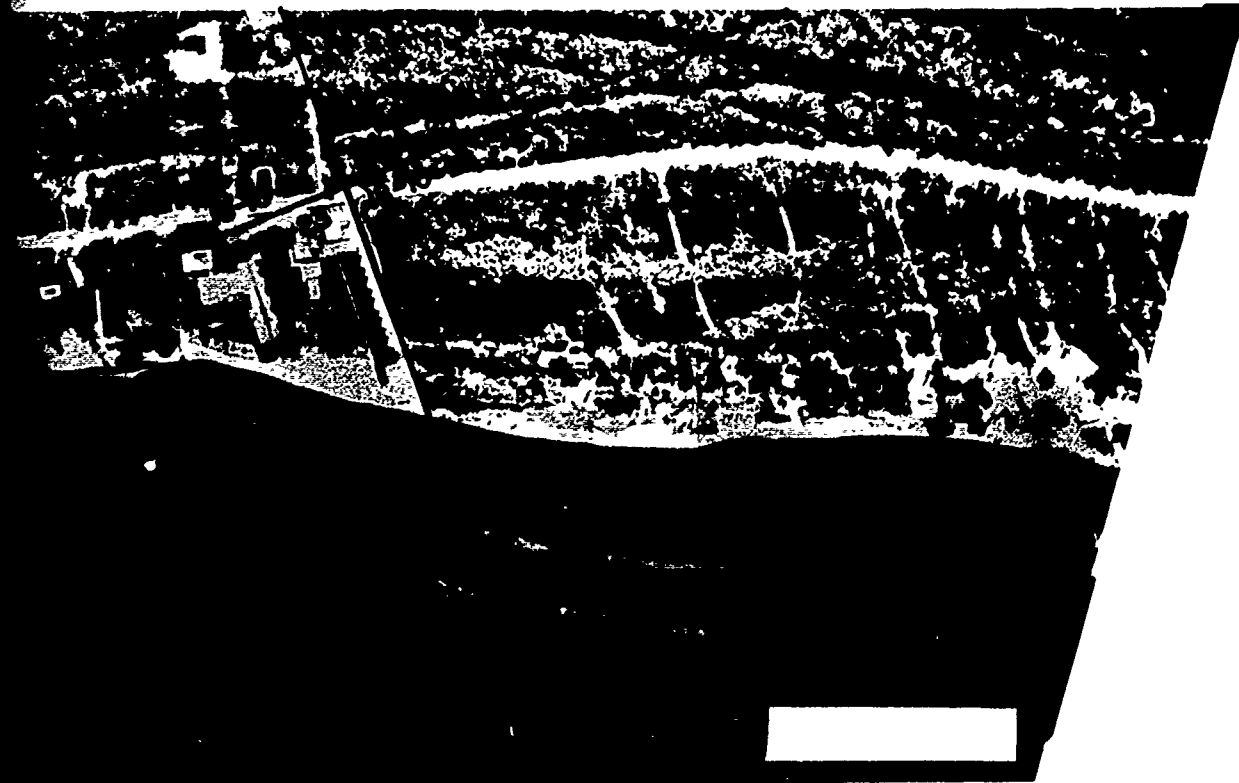
Total Identified Residential Properties: 259 Self-Administered Assessment Respondents: 26



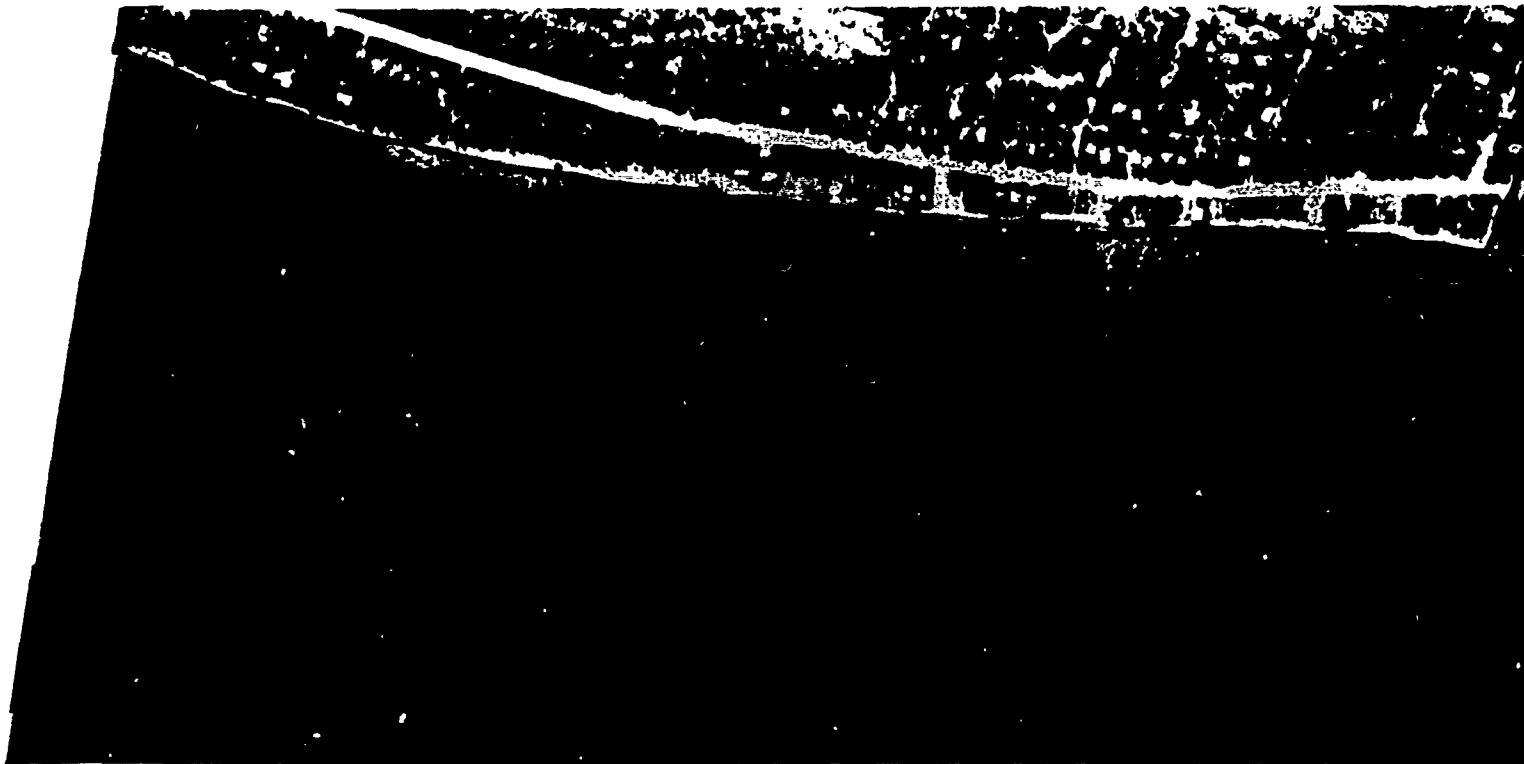
HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 16
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN



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HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 17
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN



HURON COUNTY, MICHIGAN REACH #3

Variable	No. of Responses	Mean	Standard Error of Mean	Range		Adjusted Expanded Total for All Property Listings
				Minimum	Maximum	
Assessed Value (\$)	76	9600	4800	800	22100	
Reported Market Value (\$)	49	30300	17100	5000	90000	
Bluff Height (Ft.)	53	13	9	2	45	
Beach Depth (Ft.)	48	26	24	3	125	
Bluff Lost (Ft.)	42	20	13	2	60	
Beach Lost (Ft.)	49	35	25	8	150	
Damages Erosion (\$)	25	2150	3150	100	10850	
Damages Flooding (\$)	13	2050	3150	50	12400	
Damages - Erosion and Flooding (\$)						740000
Protective Structure Cost (\$)	17	2050	2400	160	9300	230000
Total Damages (\$)	36	3200	4250	50	18000	970000

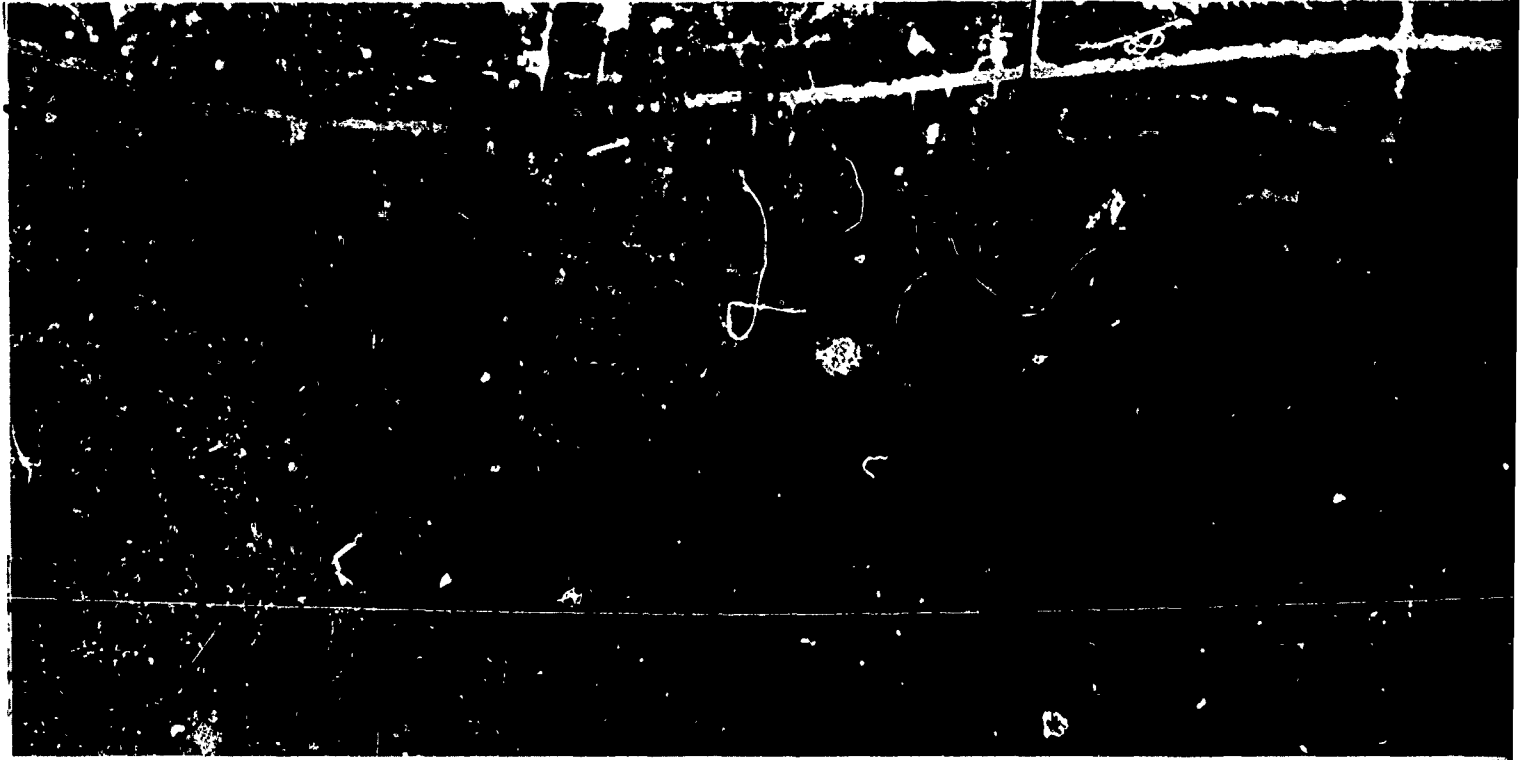
Total Identified Residential Properties: 647

Number of Self-Administered Assessments Mailed: 98

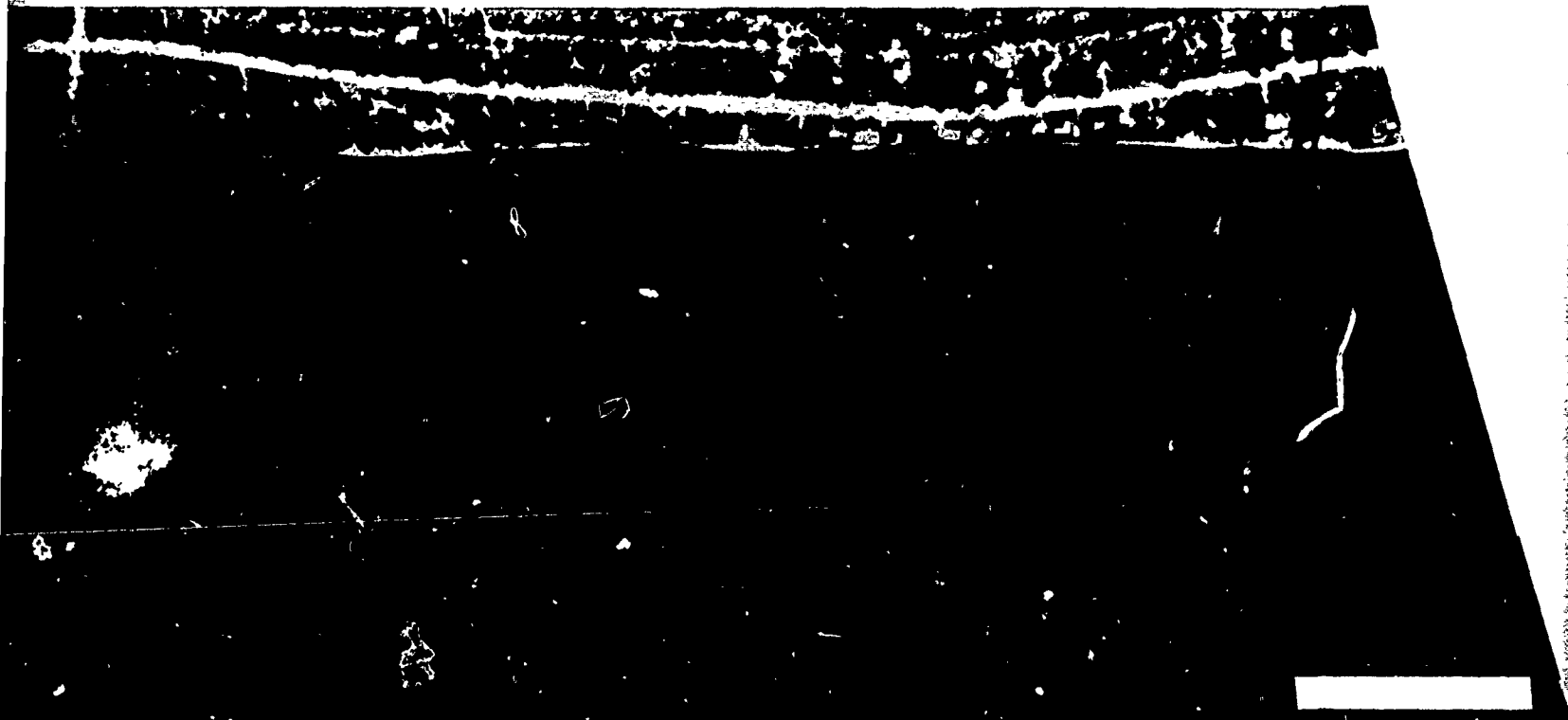
Self-Administered Assessment Respondents: 77



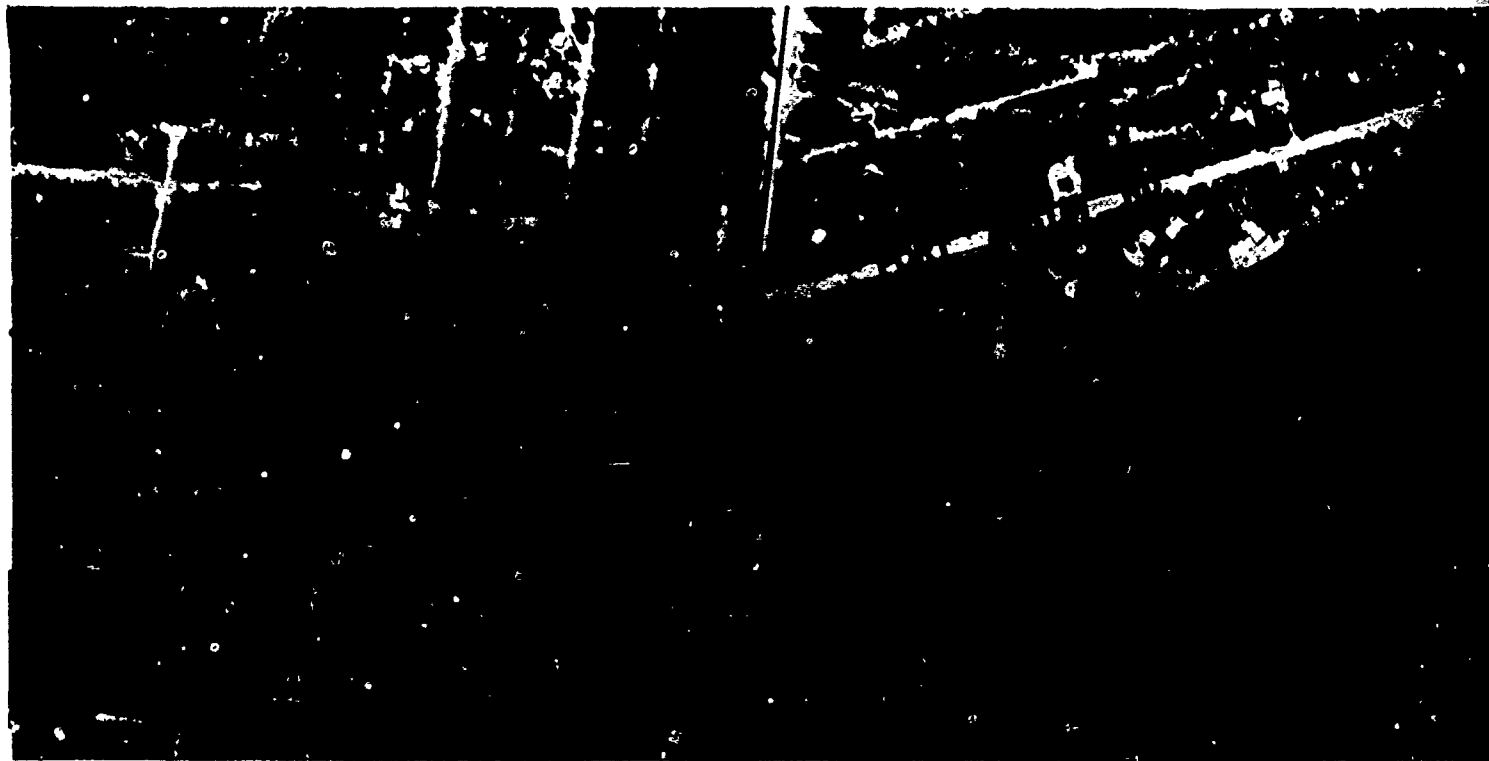
HURON COUNTY
 PILOT DAMAGE STUDY, 1975
 PLATE NO. 18
 SCALE: 1" = 500'
 COASTAL ZONE LABORATORY
 THE UNIVERSITY OF MICHIGAN

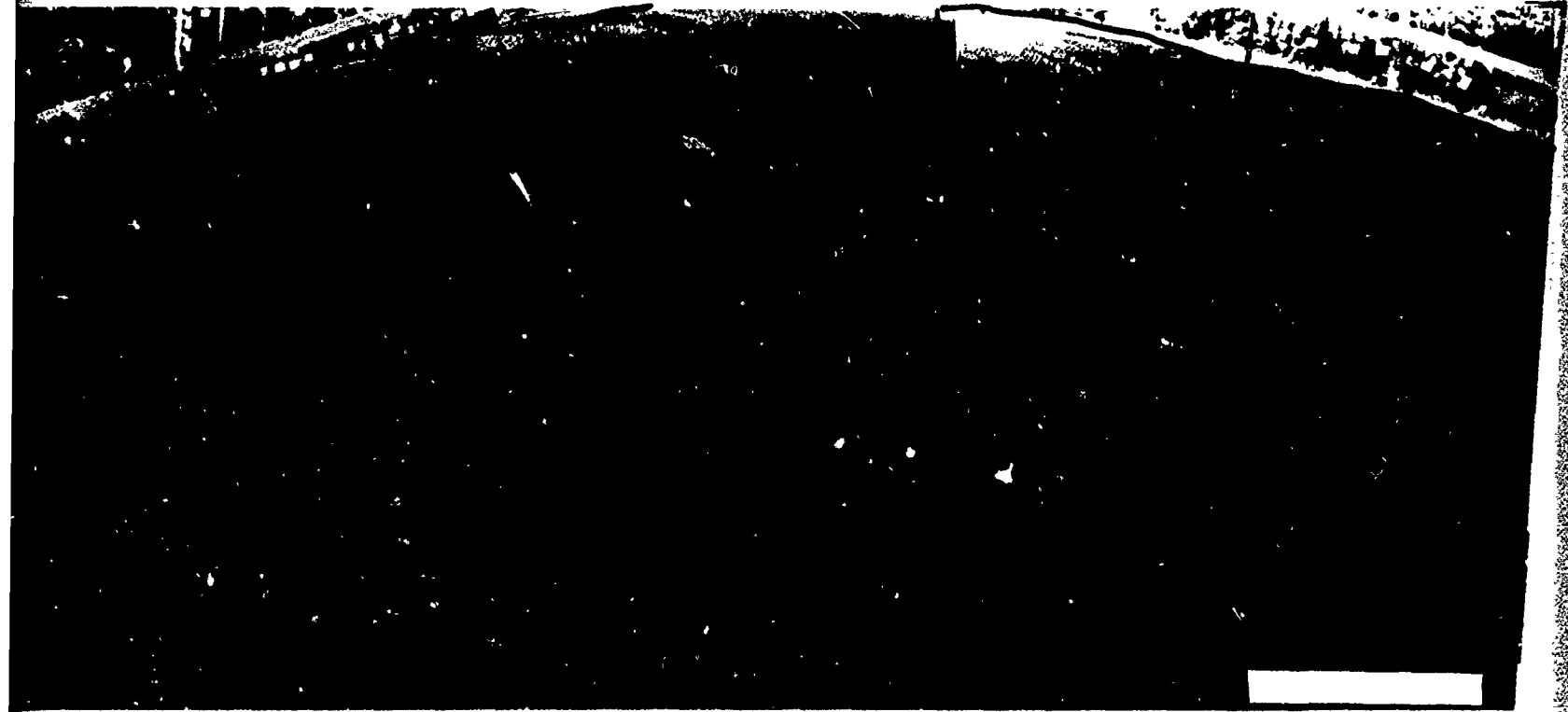


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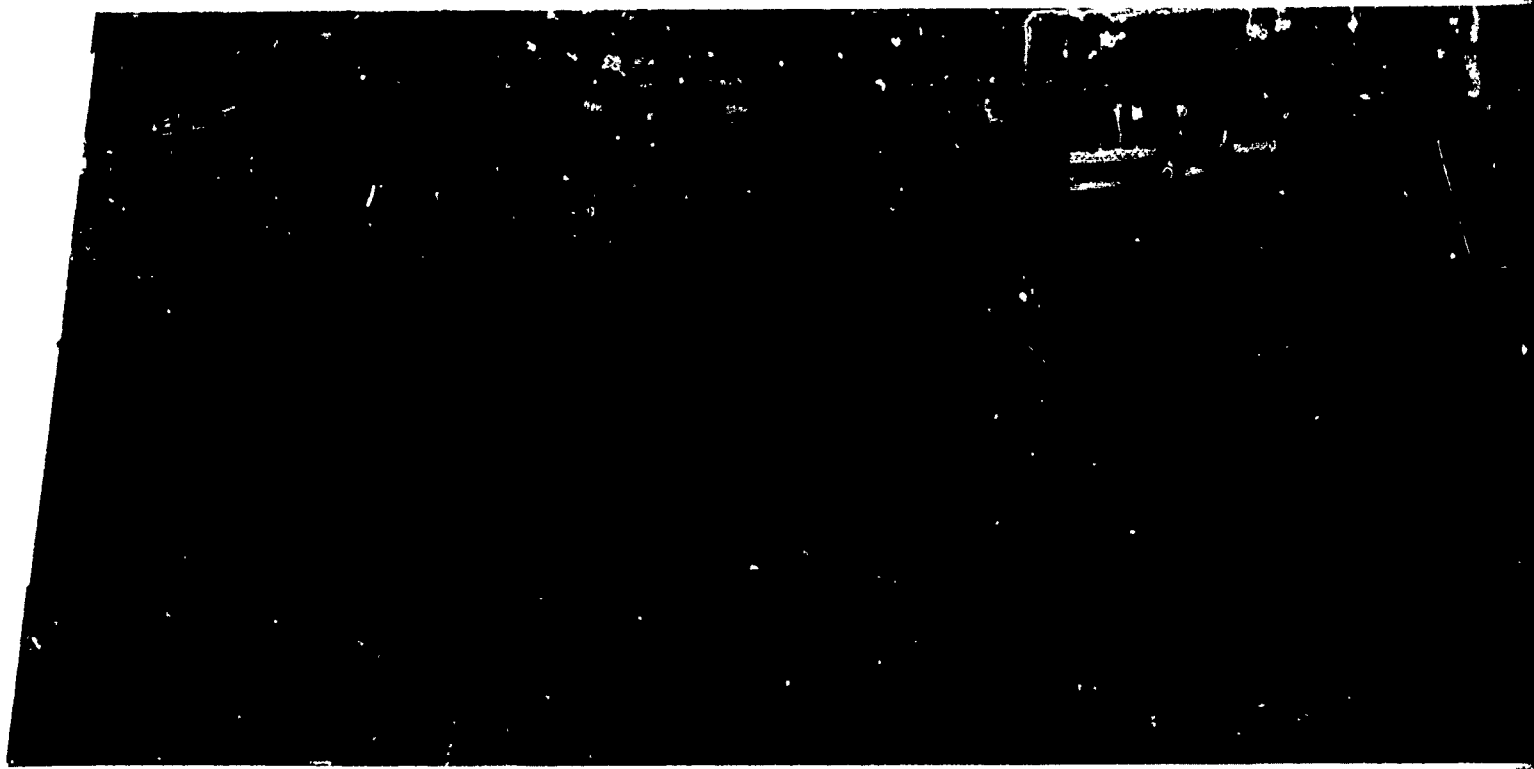
HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 19
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN





HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 20
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN

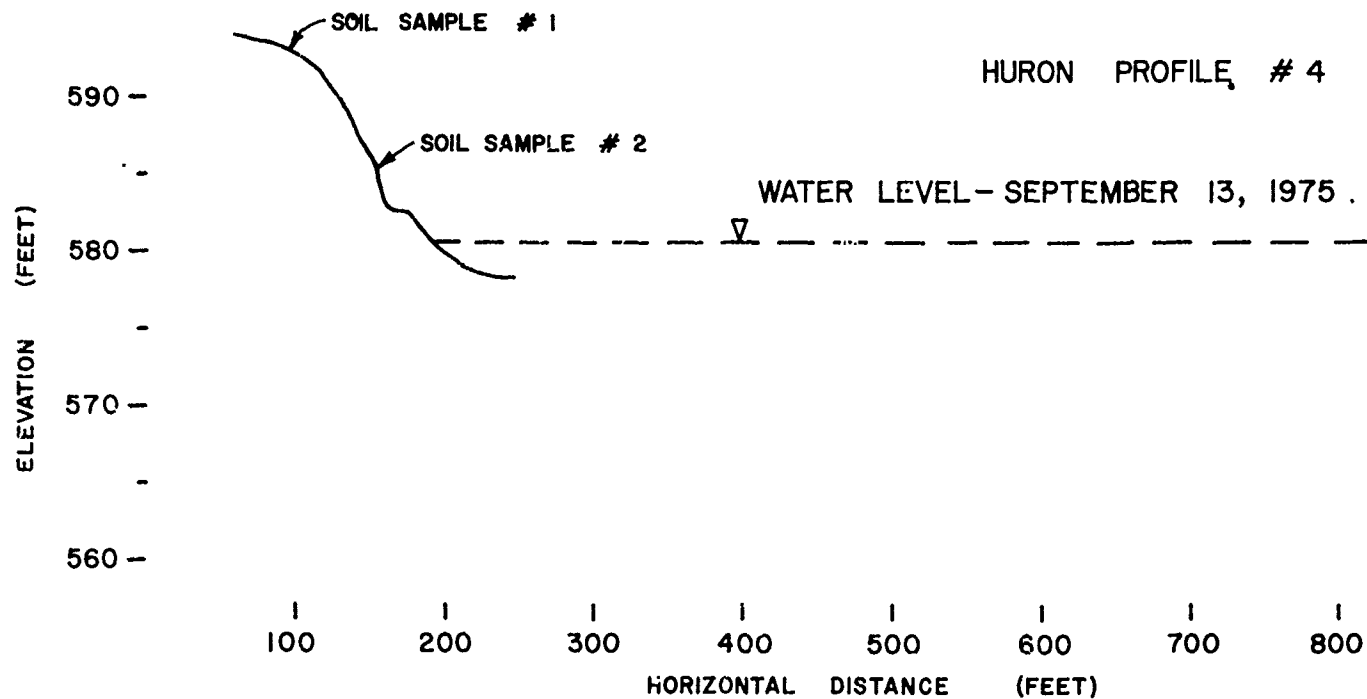
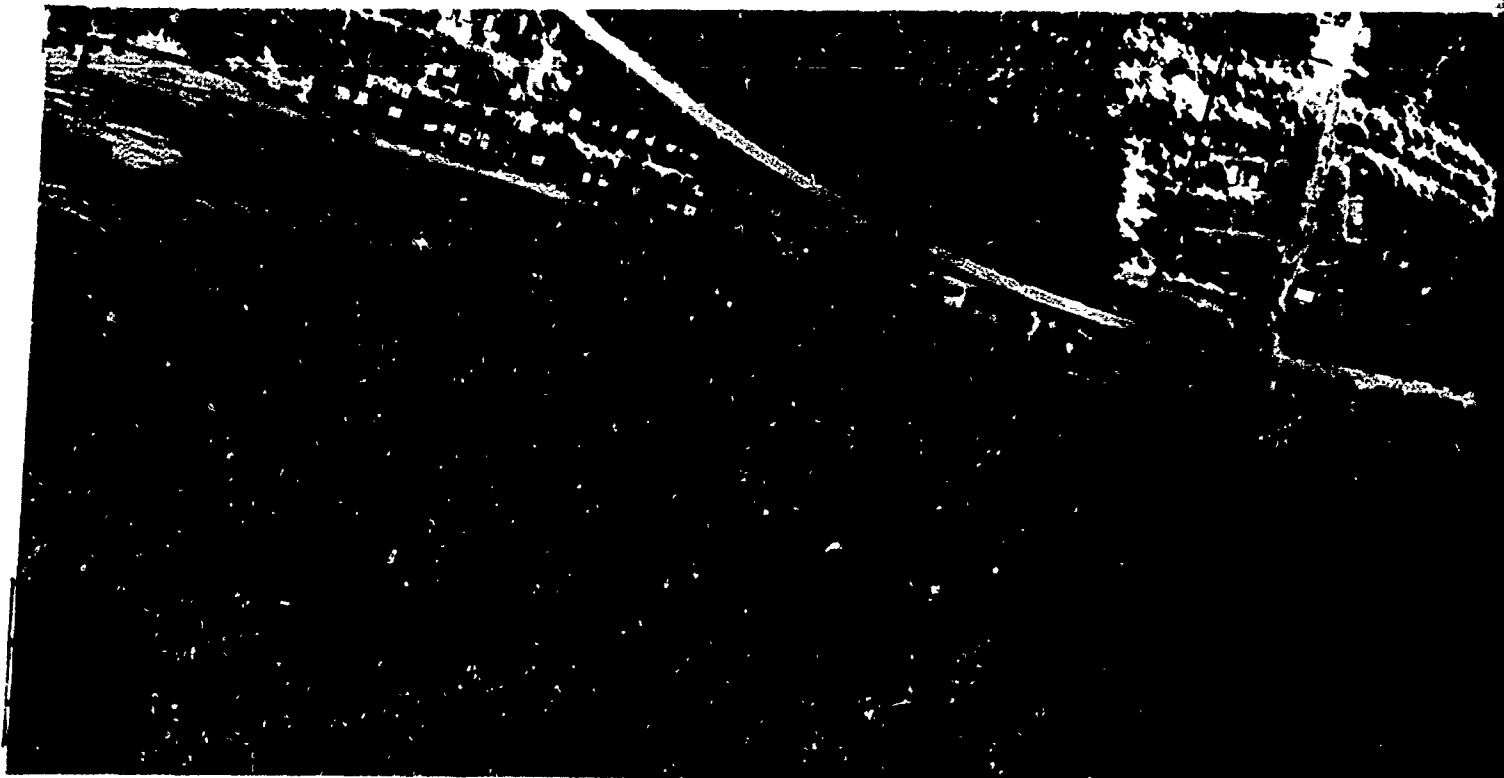
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HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 21
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN



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HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 22
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN

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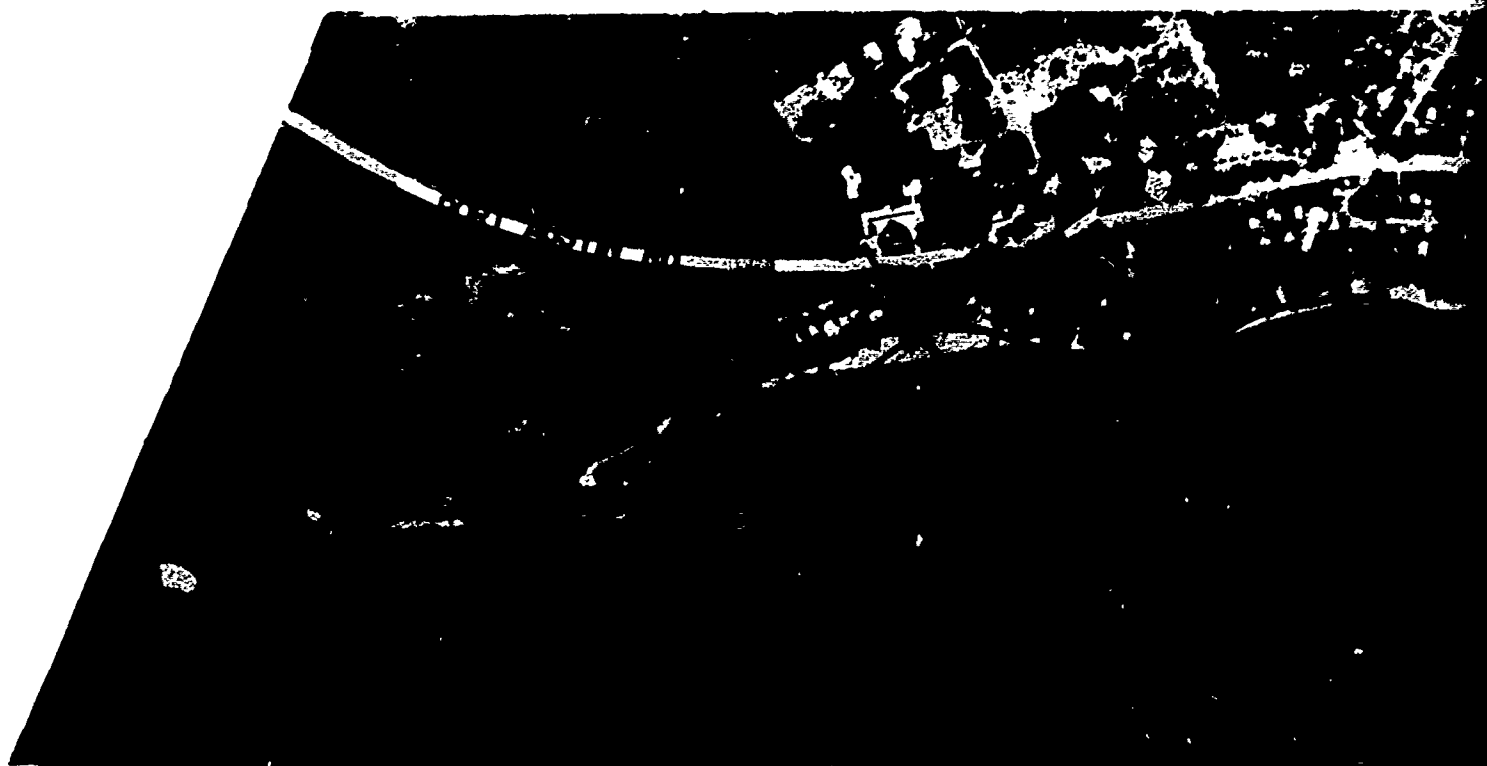


HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 23
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN



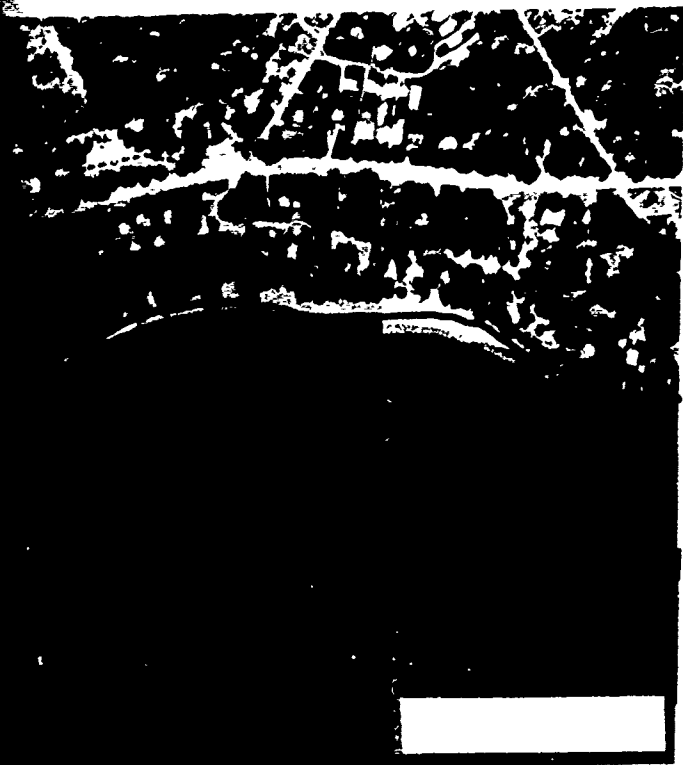


HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 24
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN



HURON CO
PILOT DAMAGE 8
PLATE NO
SCALE: 1"
COASTAL ZONE 1
THE UNIVERSITY

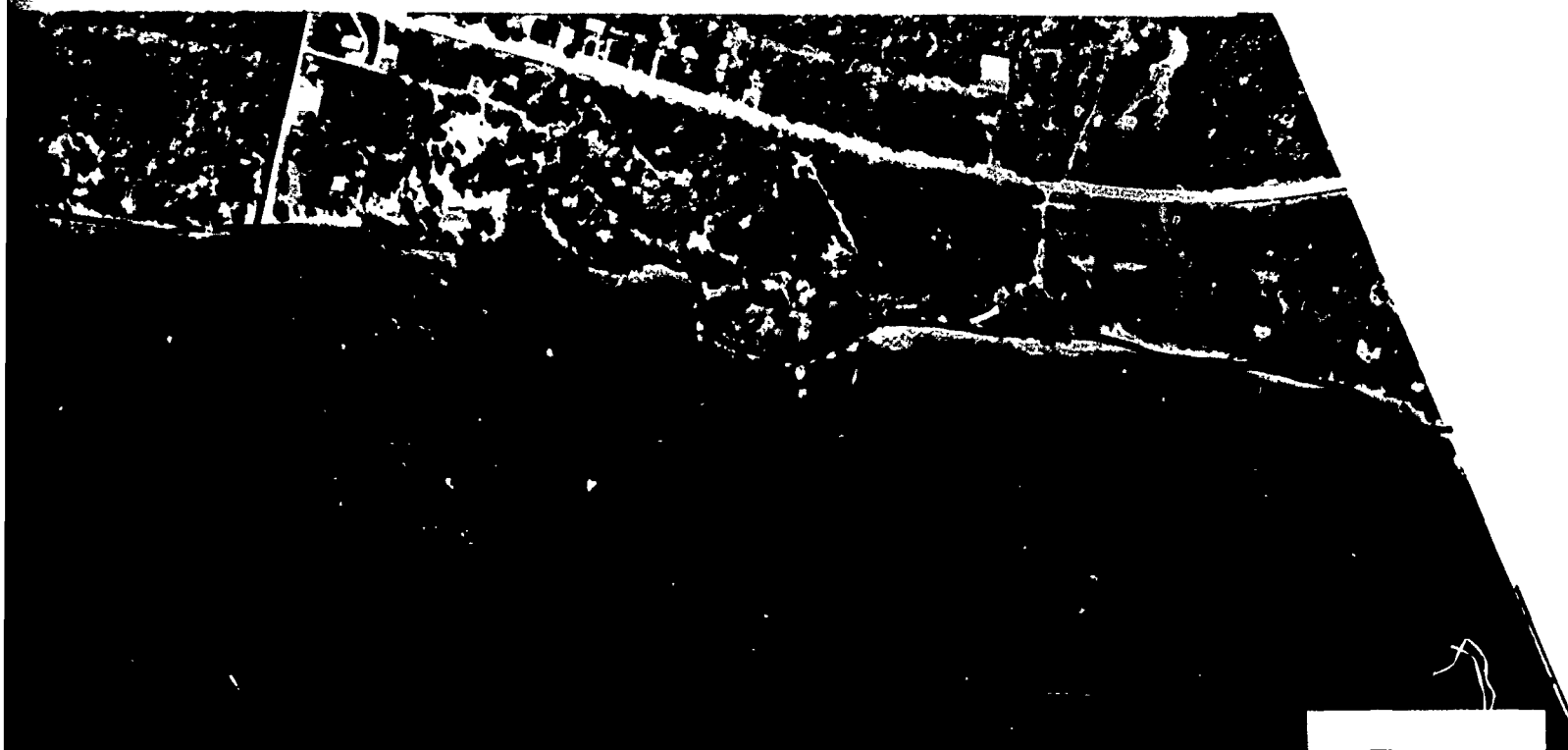
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HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 25
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN



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HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 26
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN

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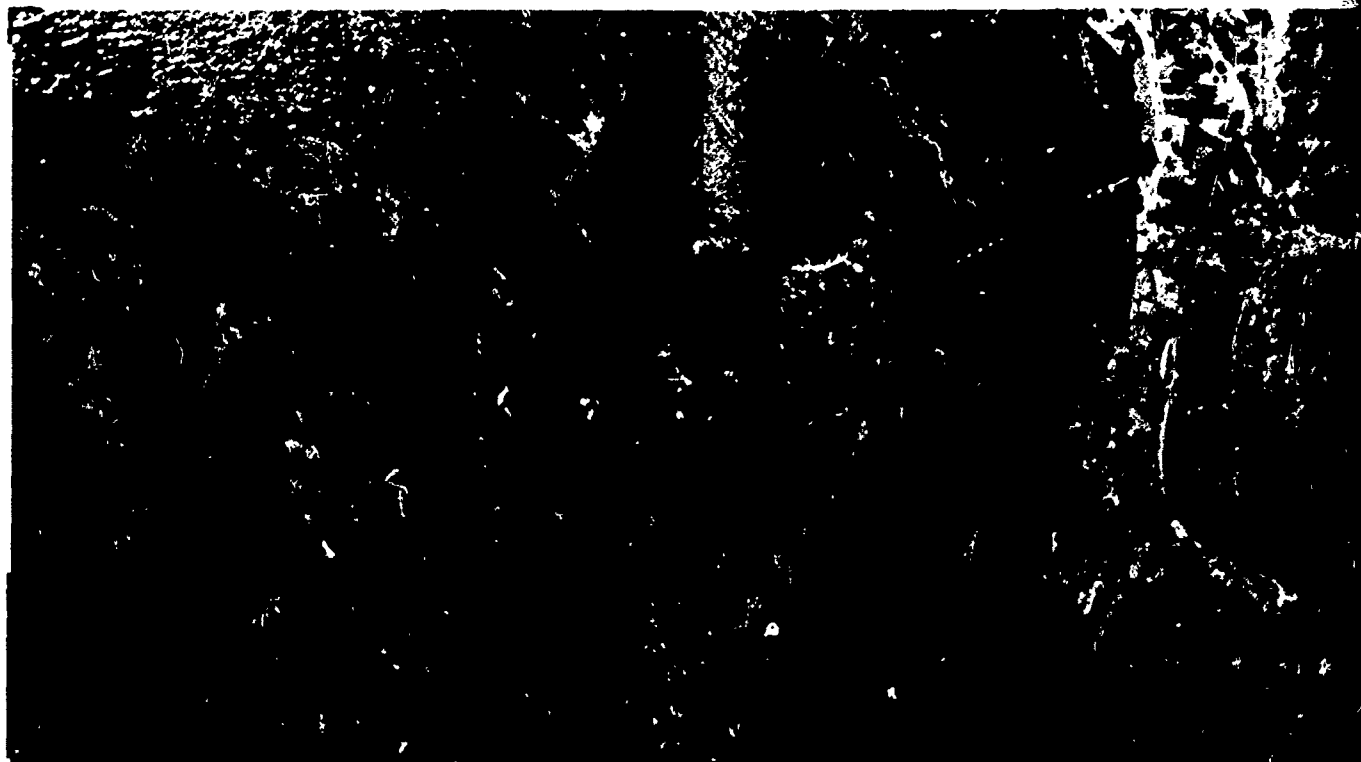
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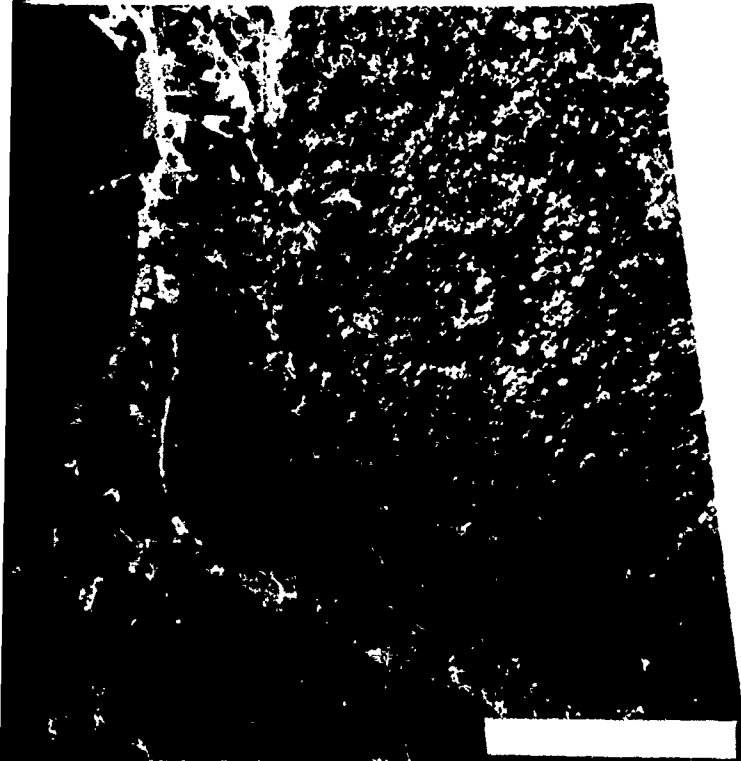


HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 27
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN



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HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 28
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN



HURON COUNTY, MICHIGAN REACH #4

Variable	No. of Responses	Mean	Standard Error of Mean	Range		Adjusted Expanded Total for All Property Listings
				Minimum	Maximum	
Assessed Value (\$)	80	6700	.4600	200	21800	
Reported Market Value (\$)	53	34400	69000	2400	500000	
Bluff height (Ft.)	43	8	8	1	40	
Beach Depth (Ft.)	29	17	18	1	88	
Bluff top (Ft.)	34	17	21	2	99	
Beach top (Ft.)	37	19	17	3	80	
Damages - Erosion (\$)	24	4500	5850	60	21000	
Damages Flooding (\$)	16	1350	1875	50	5400	
Damages - Erosion and Flooding (\$)						1090000
Protective Structure Cost (\$)	10	1400	2300	80	9400	210000
Total Damages (\$)	36	4200	5950	50	22100	1300000

Total Identified Residential Properties: 711

Number of Self-Administered Assessments Mailed: 109

Self-Administered Assessment Respondents: 83



HURON COUNTY, MICHIGAN REACH #4

Variable	No. of Responses	Mean	Standard Error of Mean	Range		Adjusted Expanded Total for All Property Listings
				Minimum	Maximum	
Assessed Value (\$)	80	6700	.4602	200	21800	
Reported Market Value (\$)	53	34400	69000	2400	500000	
Bluff Height (Ft.)	43	8	8	1	40	
Beach Depth (Ft.)	29	17	18	1	88	
Bluff Lost (Ft.)	34	17	21	2	99	
Beach Lost (Ft.)	37	19	17	3	80	
Damages Erosion (\$)	24	4500	5850	60	21000	
Damages Flooding (\$)	16	1350	1800	50	5400	
Damages - Erosion and Flooding (\$)						1090000
Protective Structure Cost (\$)	16	1400	2300	80	9400	210000
Total Damages (\$)	36	4200	5950	50	22100	1300000

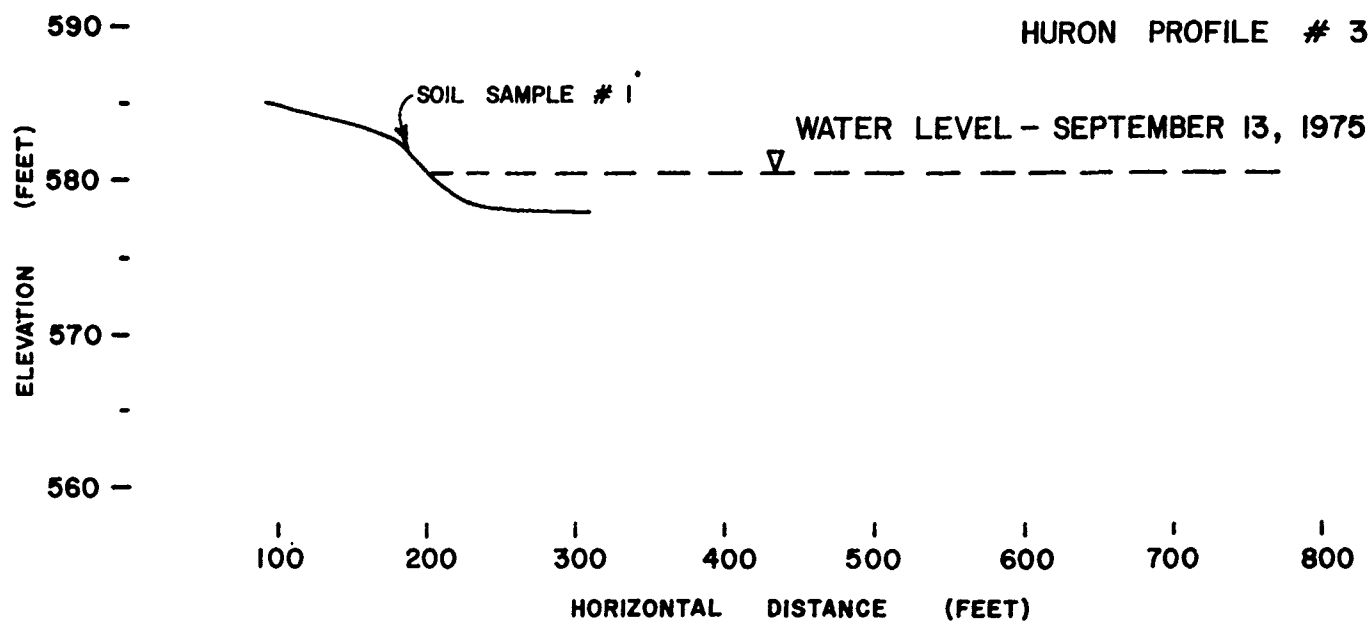
Total Identified Residential Properties: 711

Number of Self-Administered Assessments Mailed: 109

Self-Administered Assessment Respondents: 83



HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 29
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN





PROFILE # 3

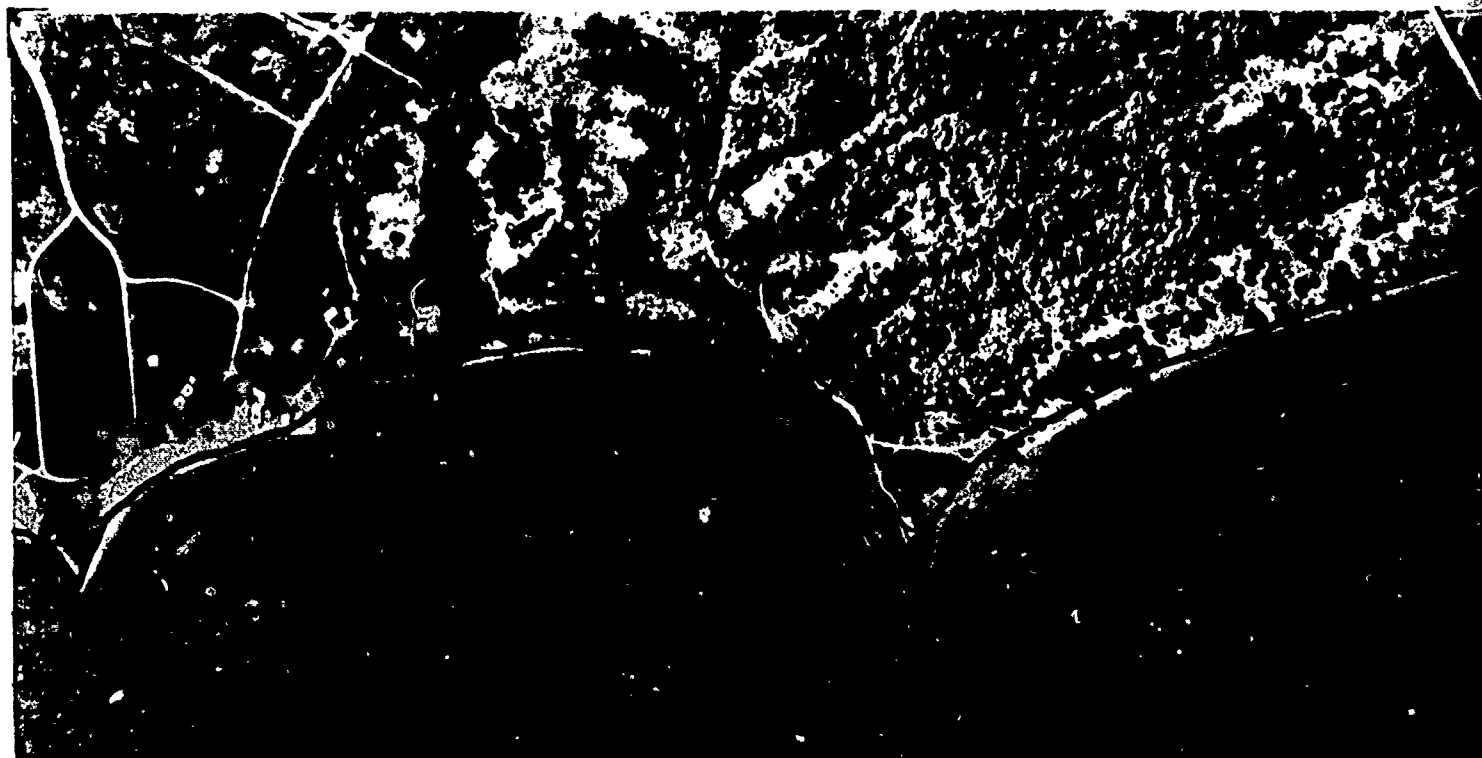
ER 13, 1975

HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 30
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN

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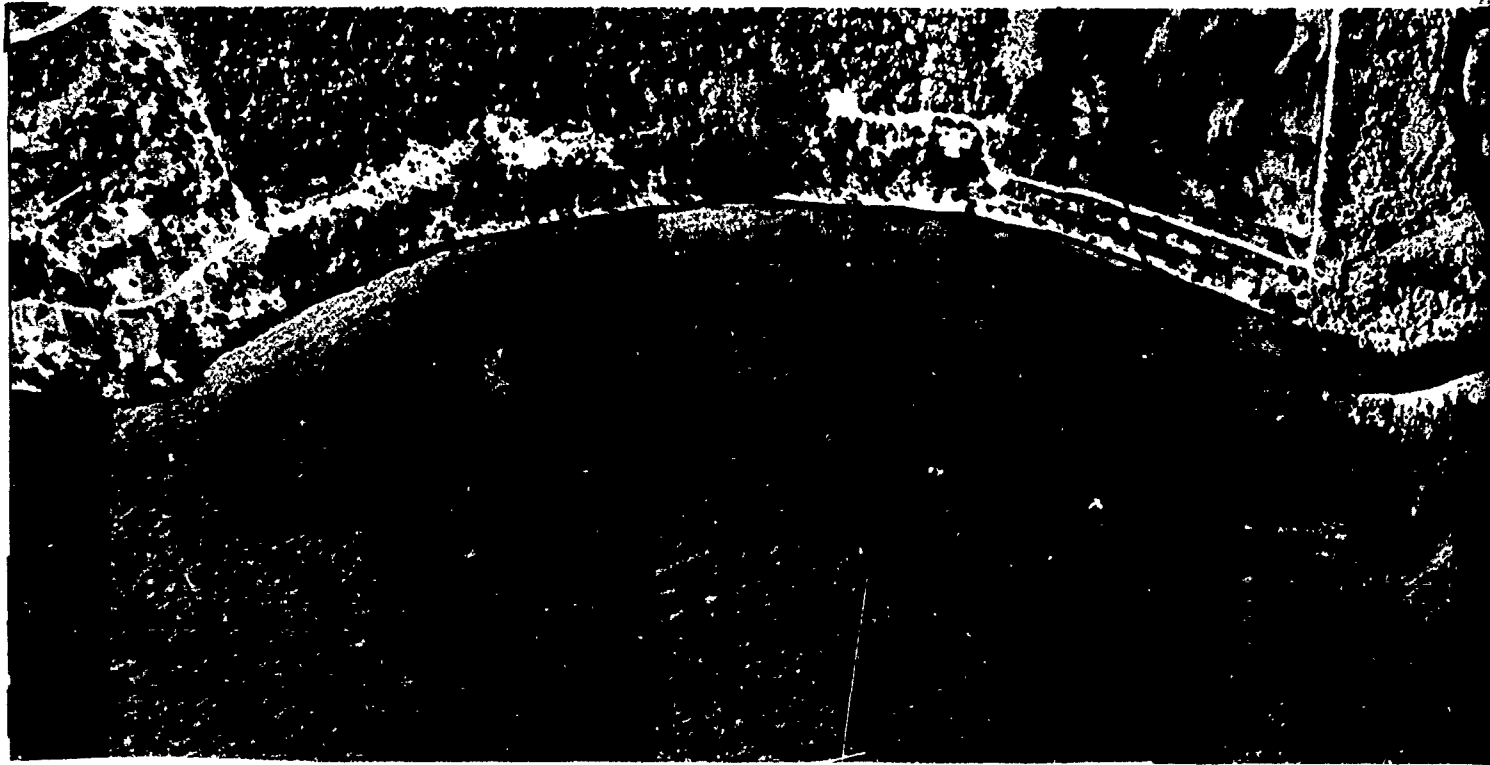
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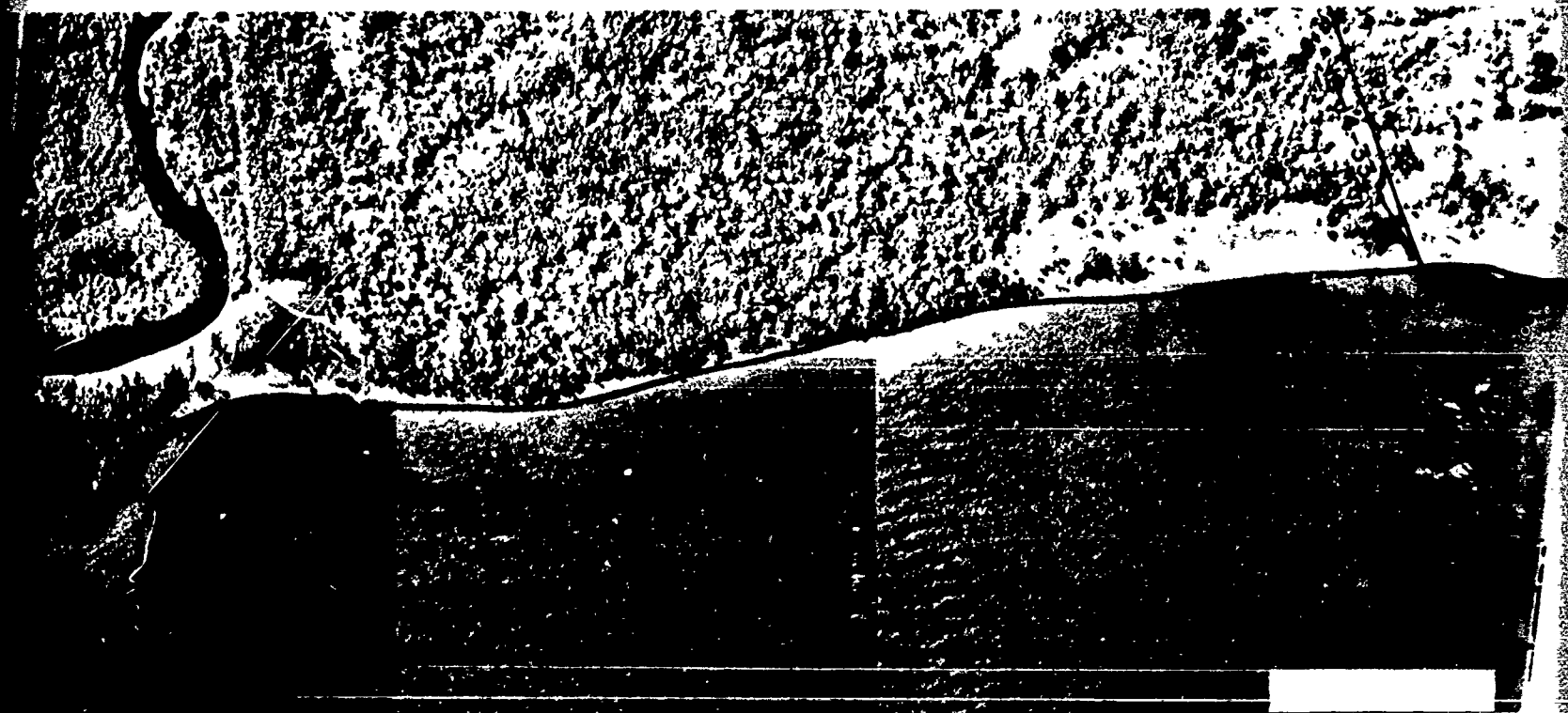
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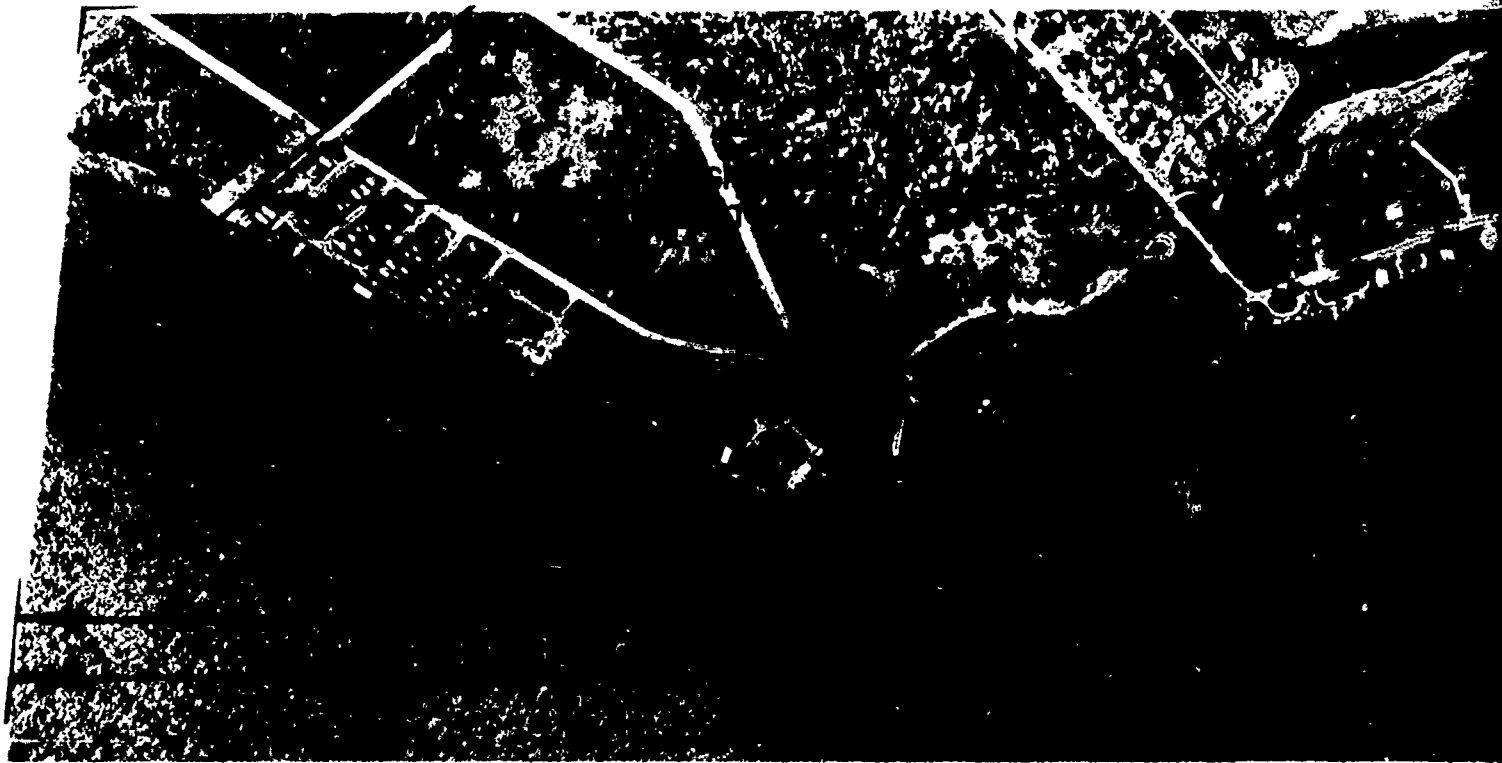
HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 31
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN





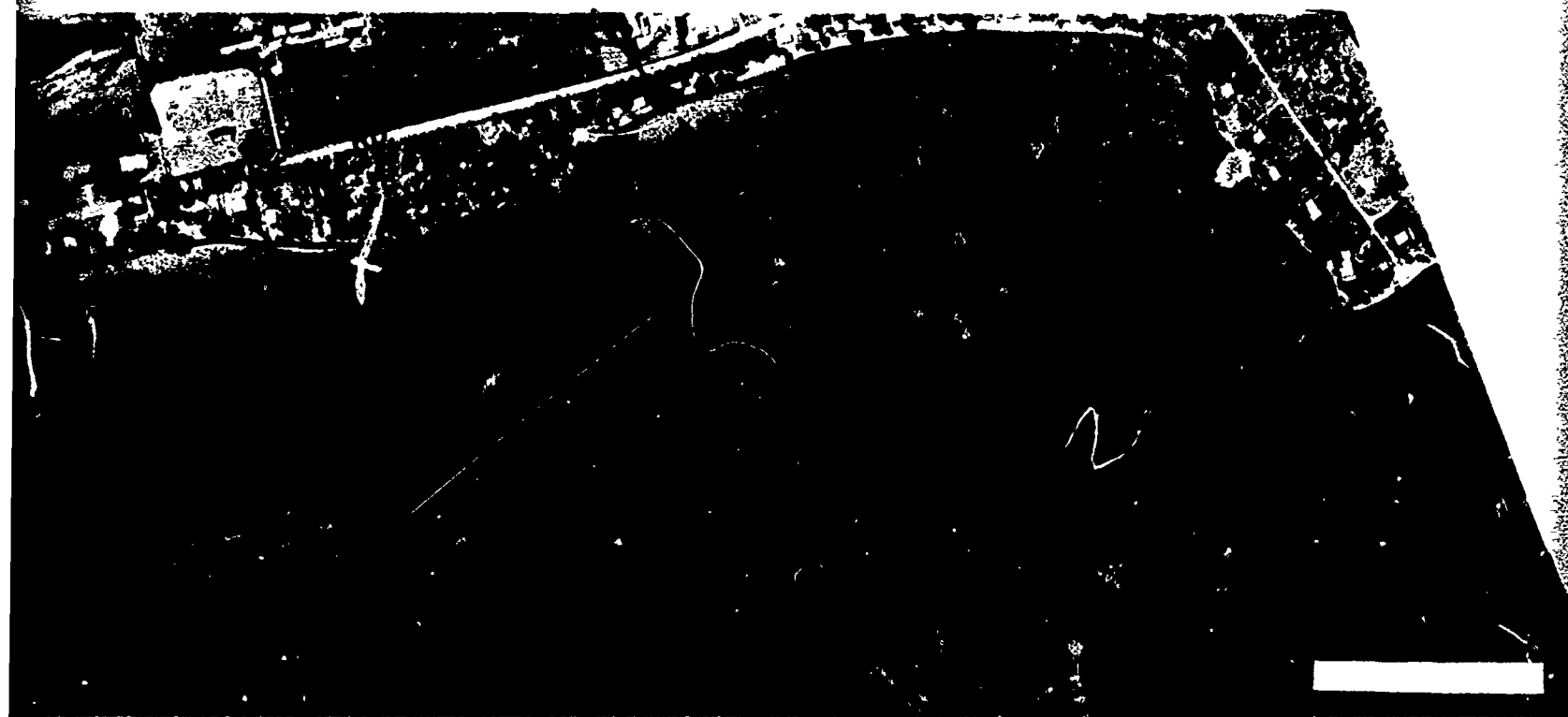
HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 32
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN

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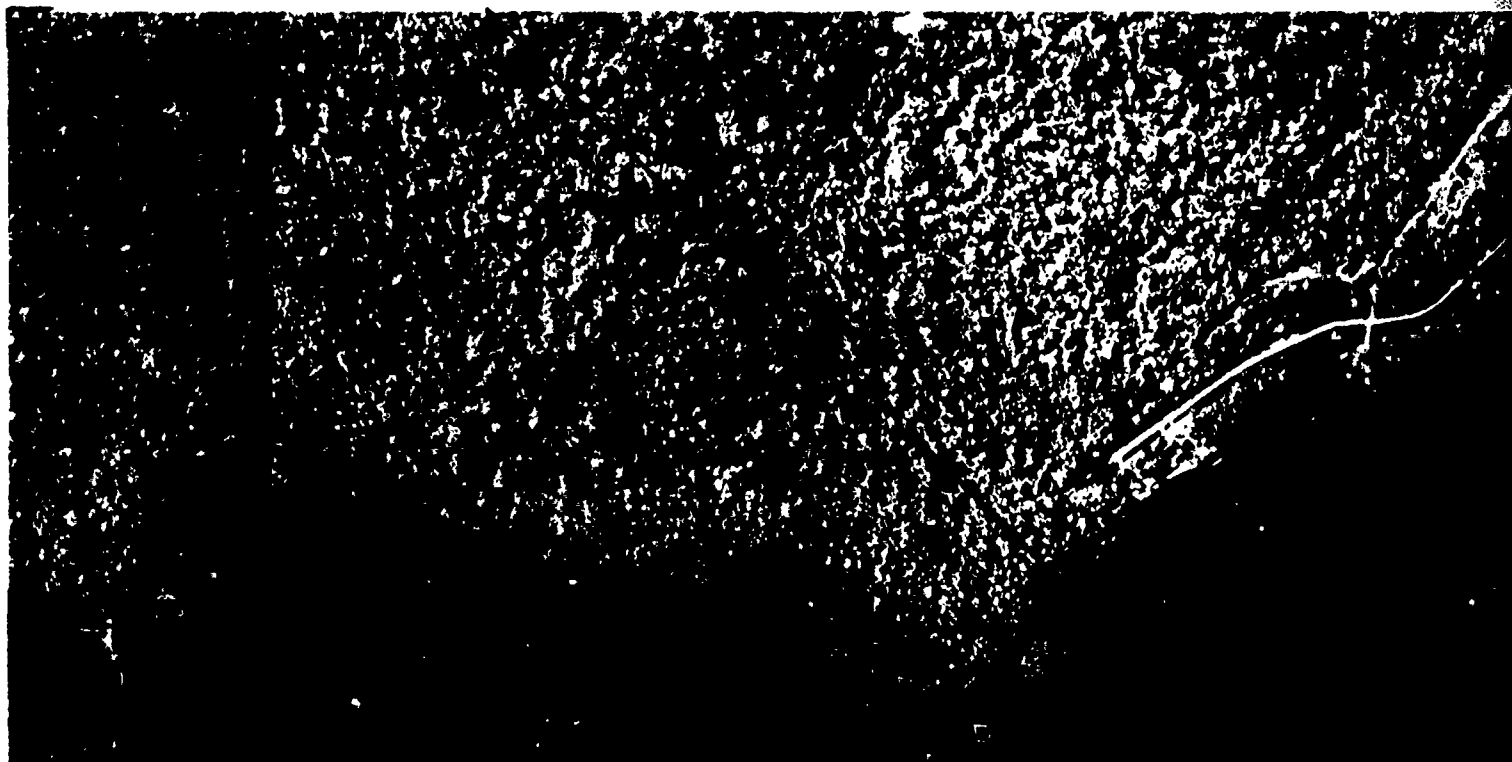
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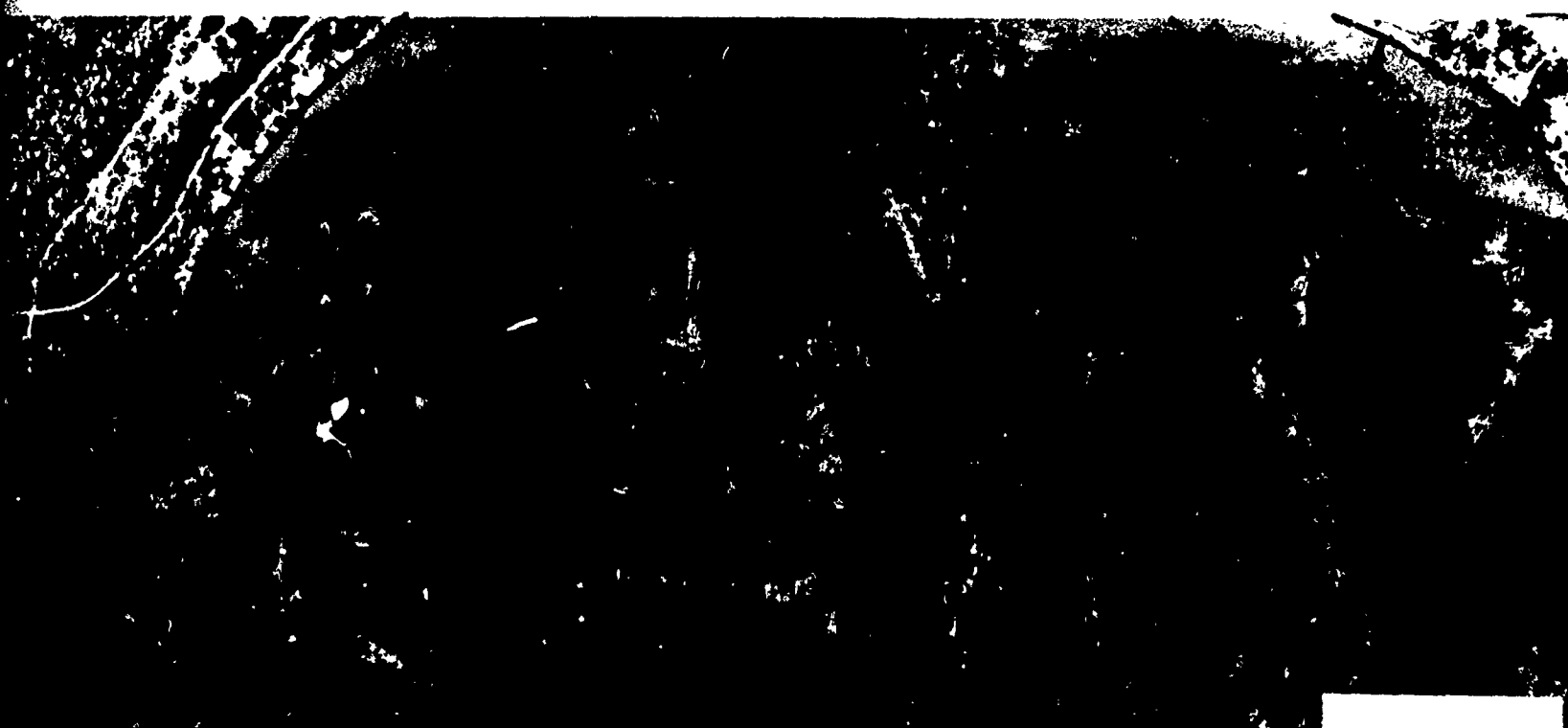
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HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 33
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN

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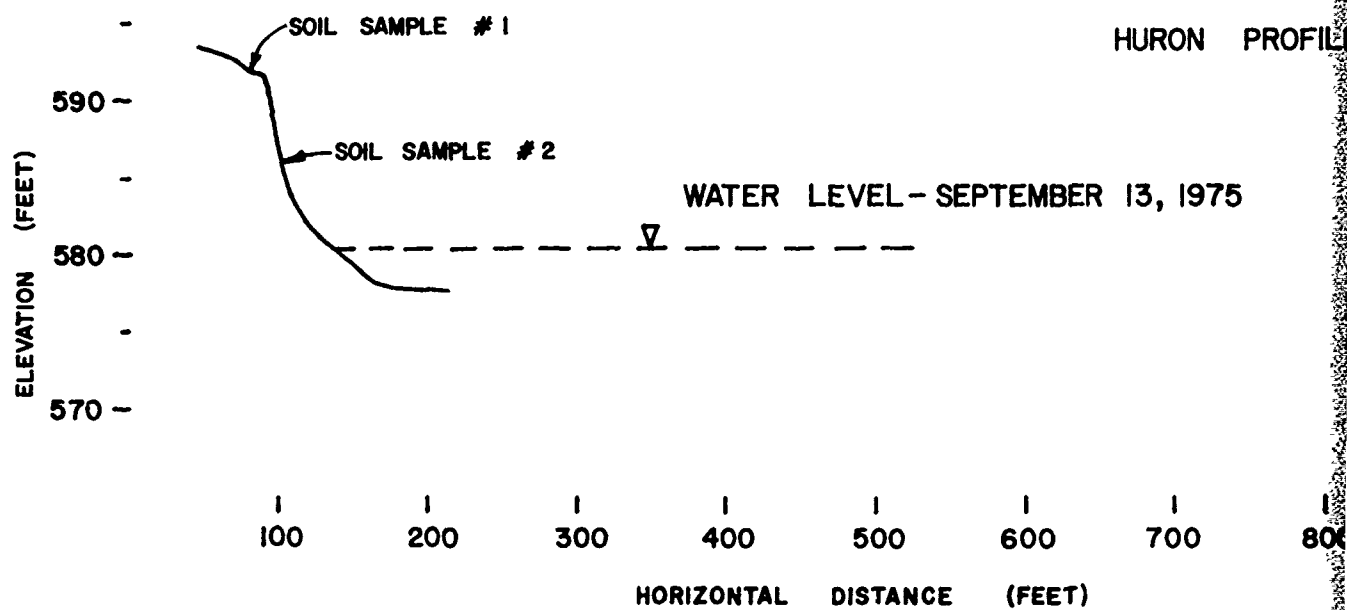
HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 34
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN



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HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 35
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN



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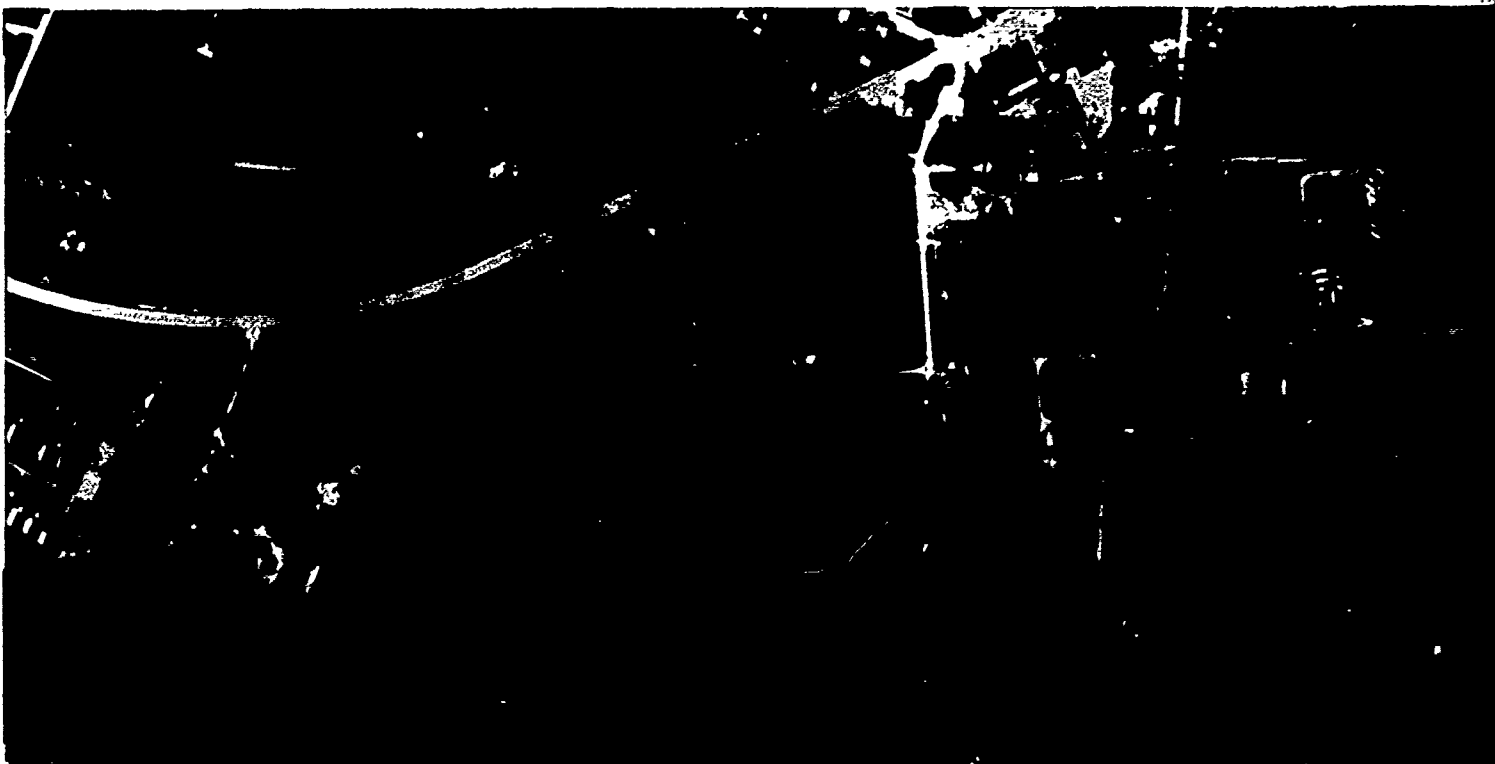


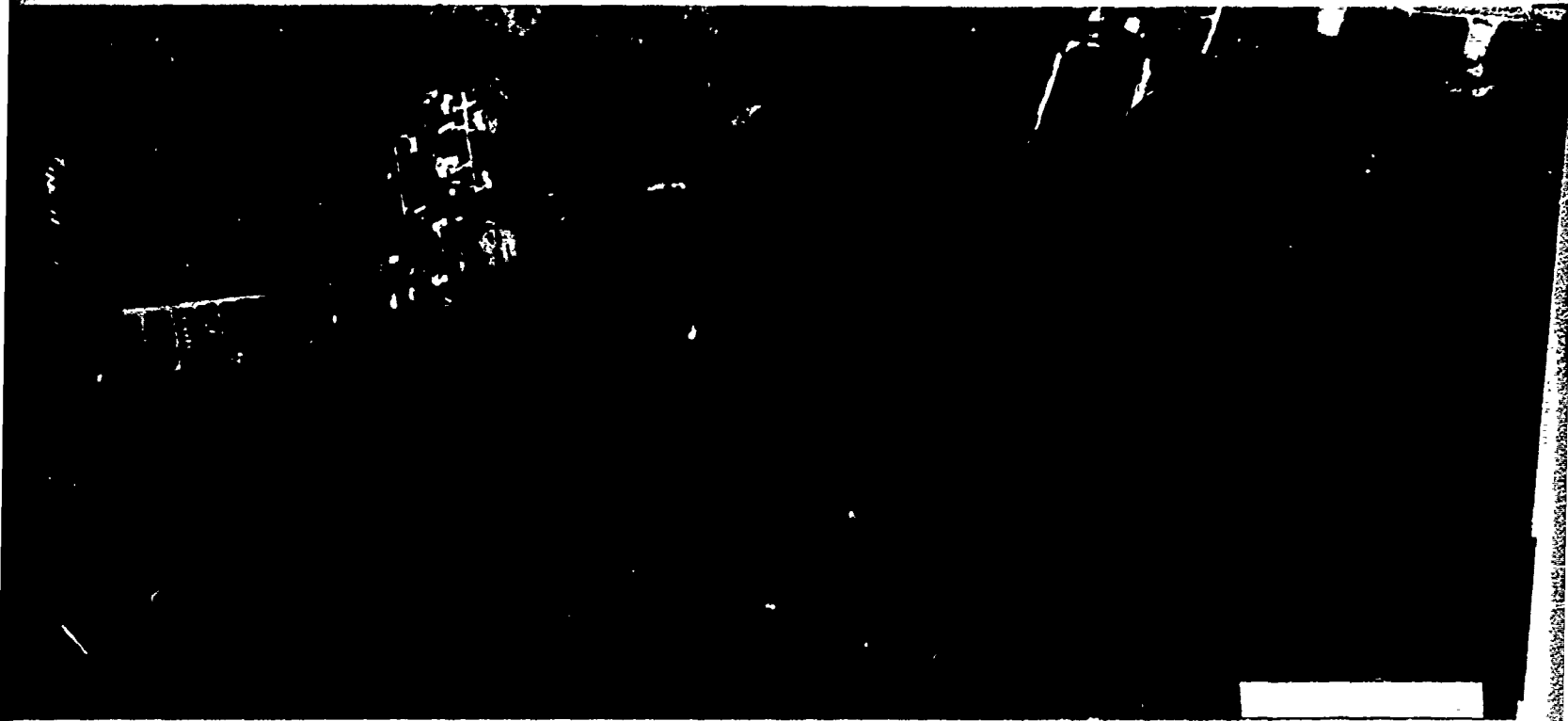
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1975

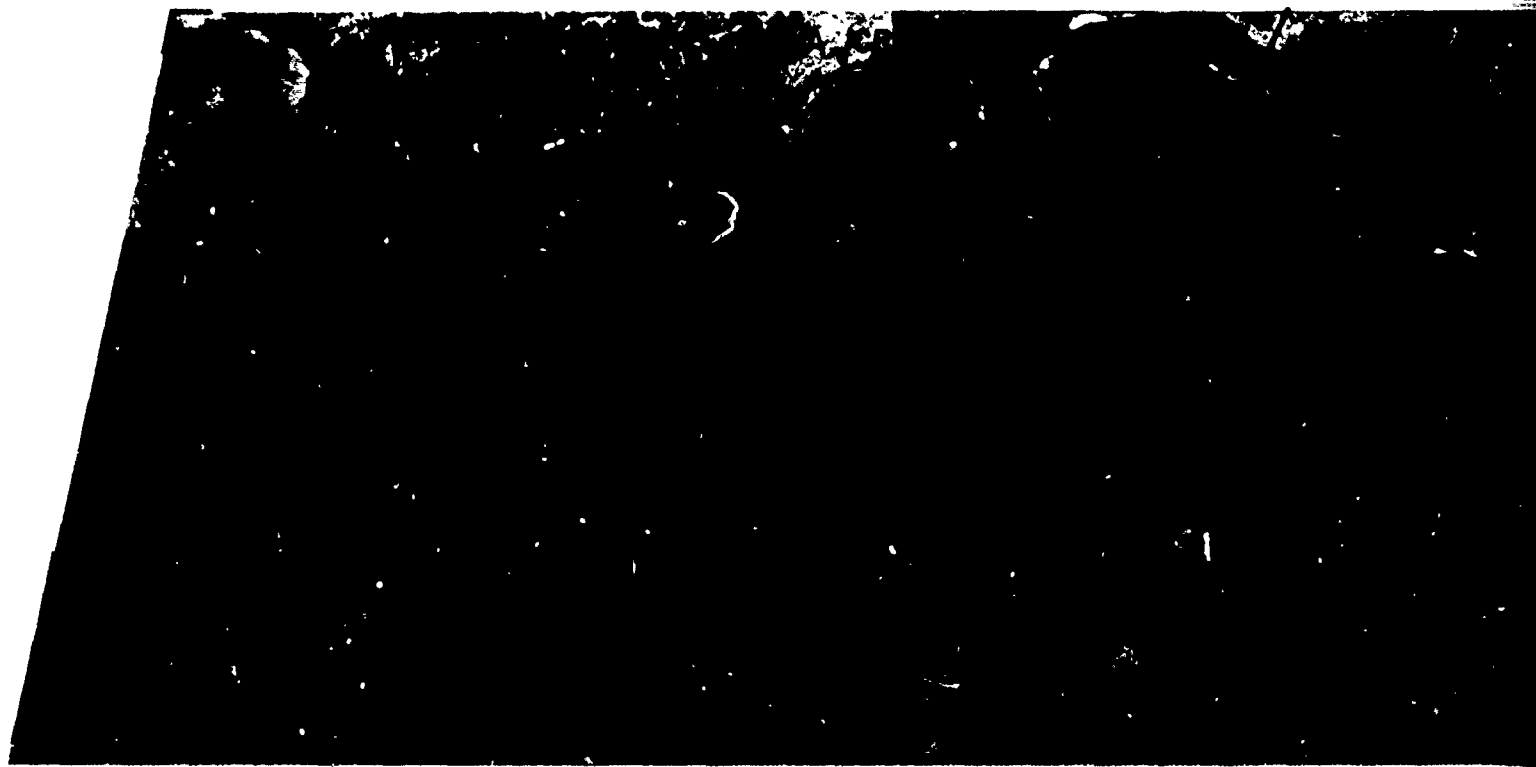
HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 36
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN

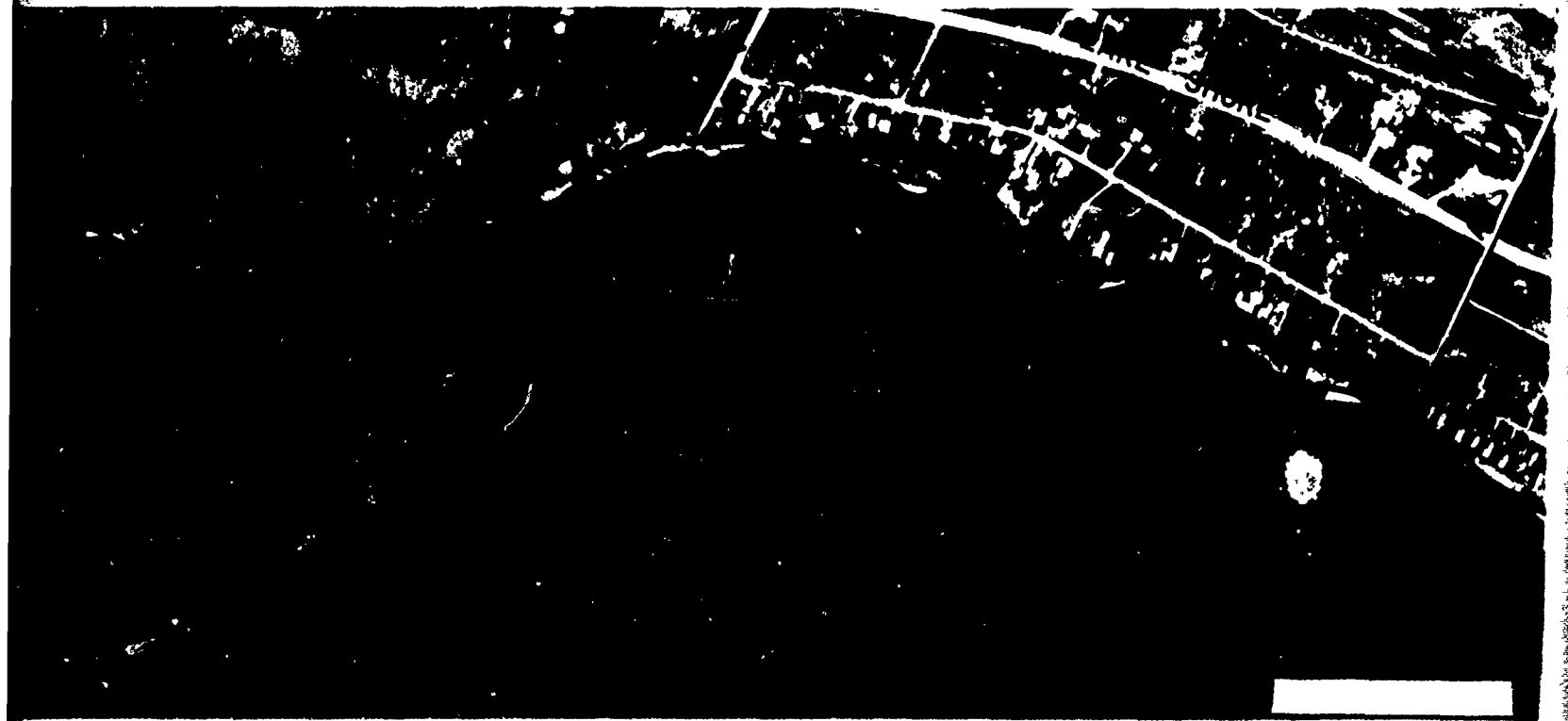
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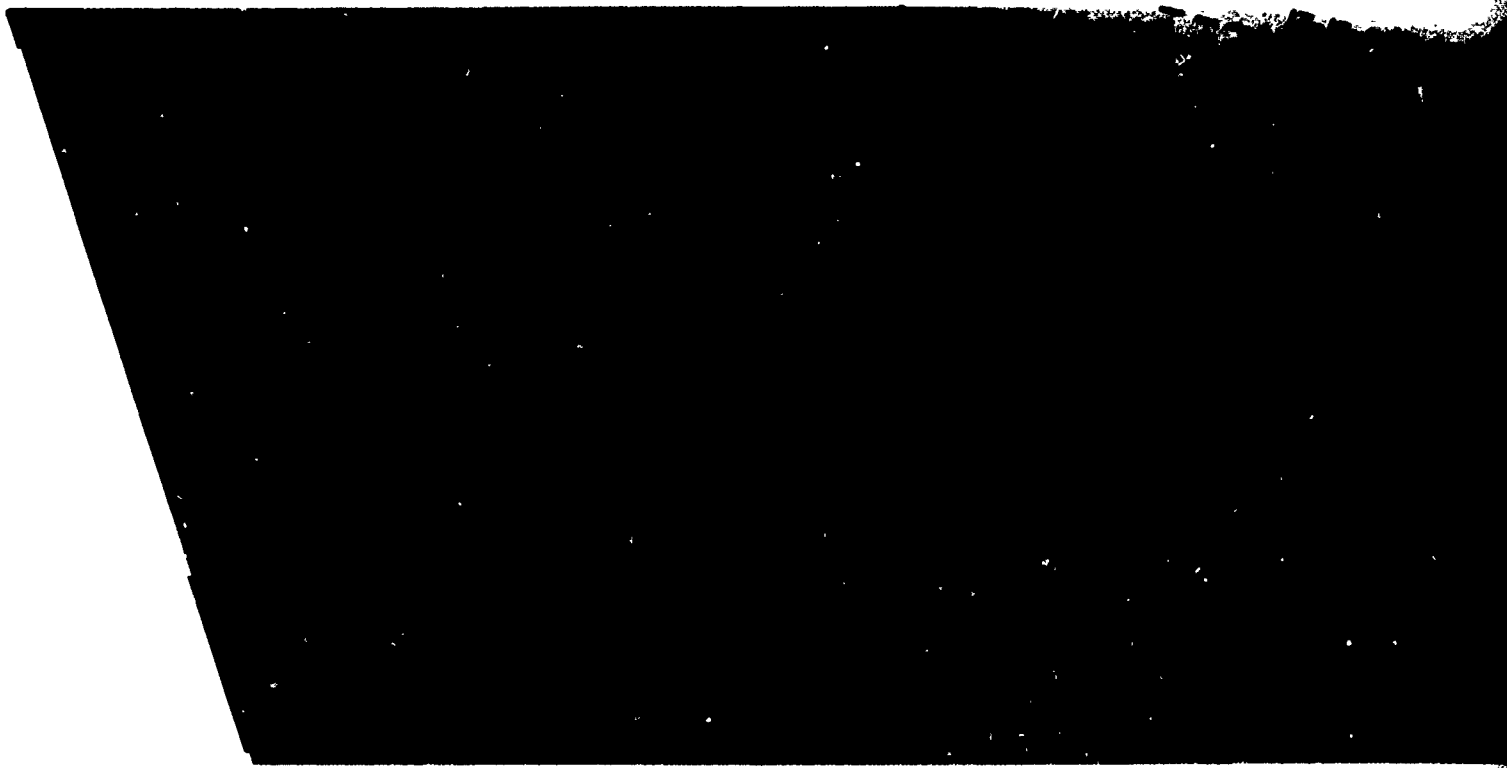
HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 37
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN





HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 38
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN

1



2

2



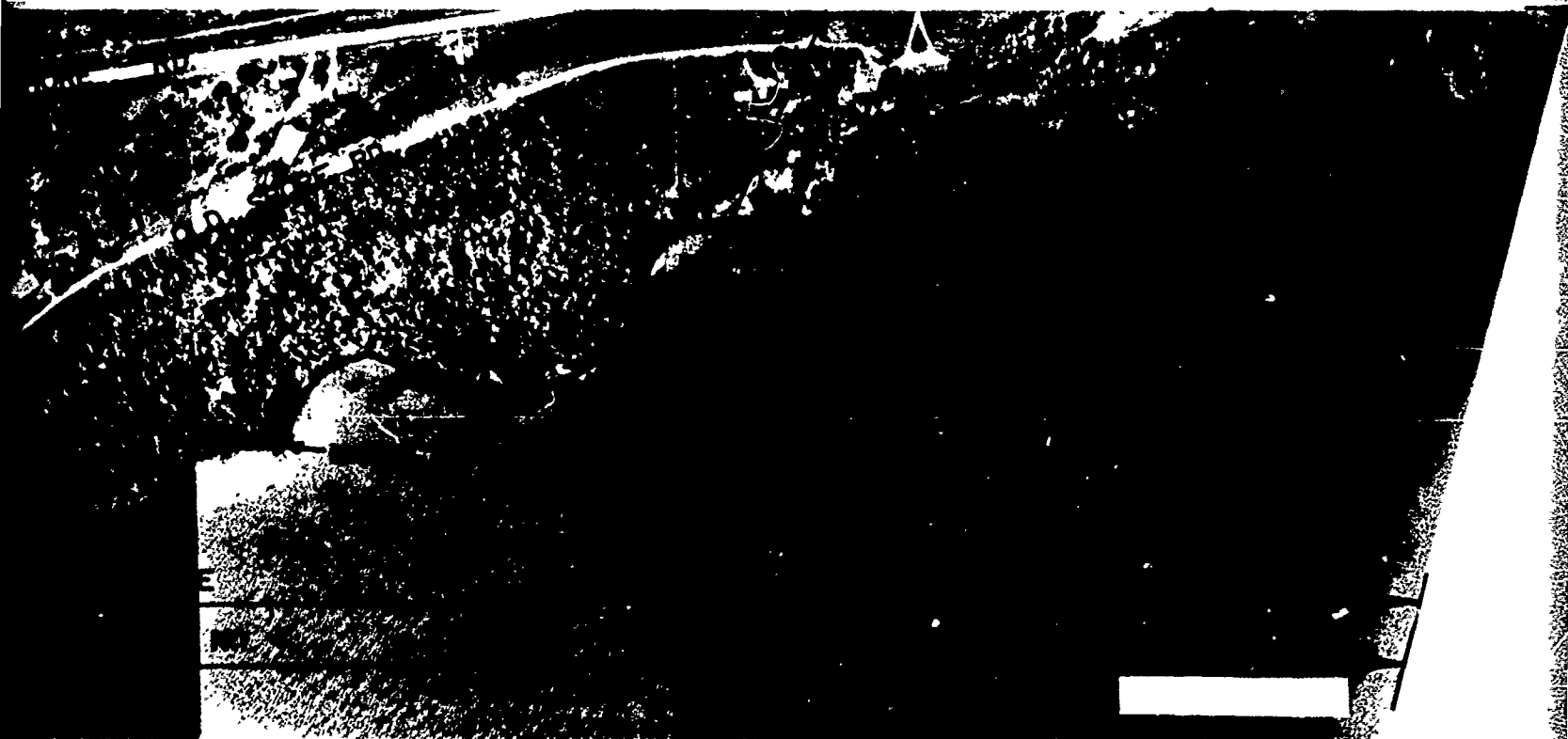
HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 39
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN

1

(1)

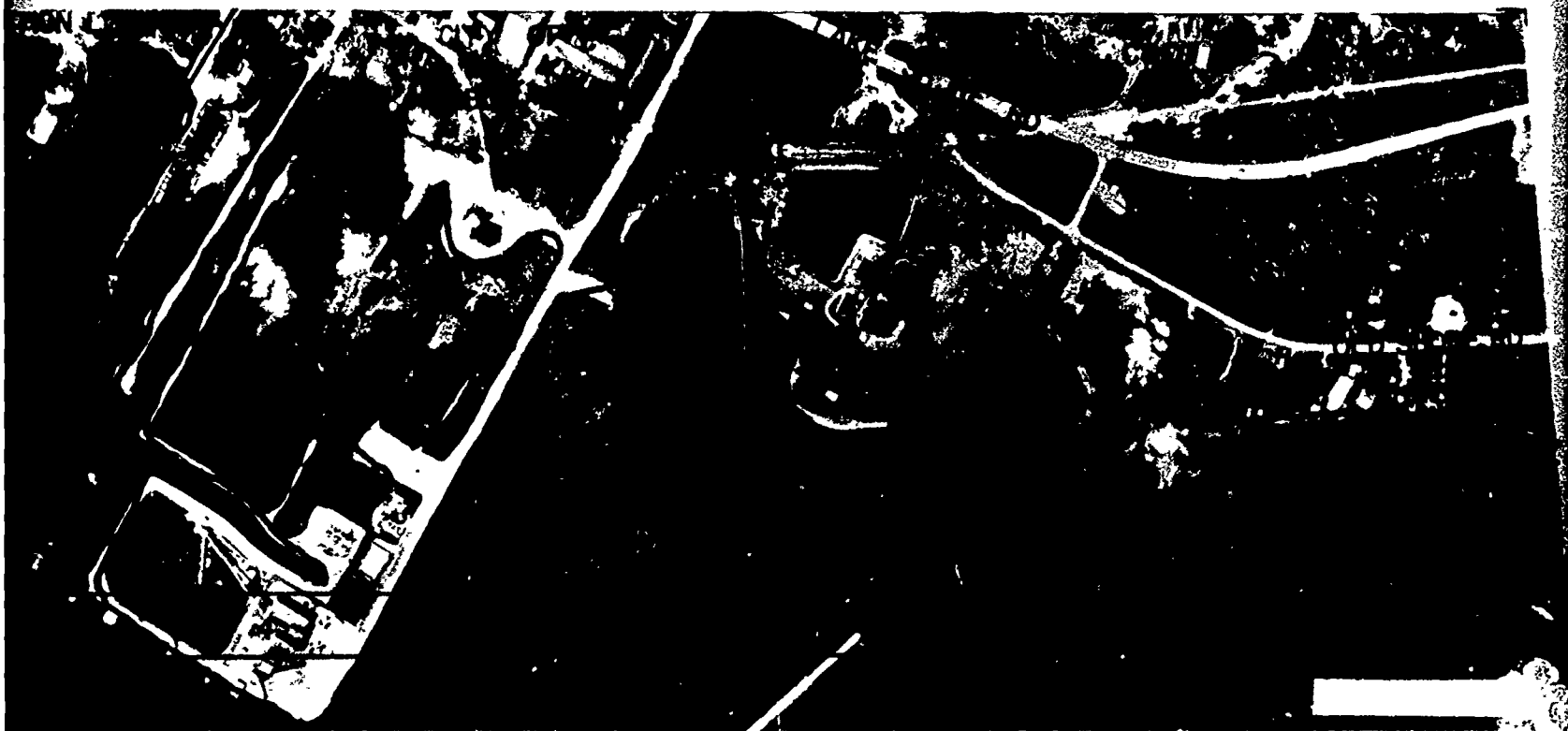


(2)



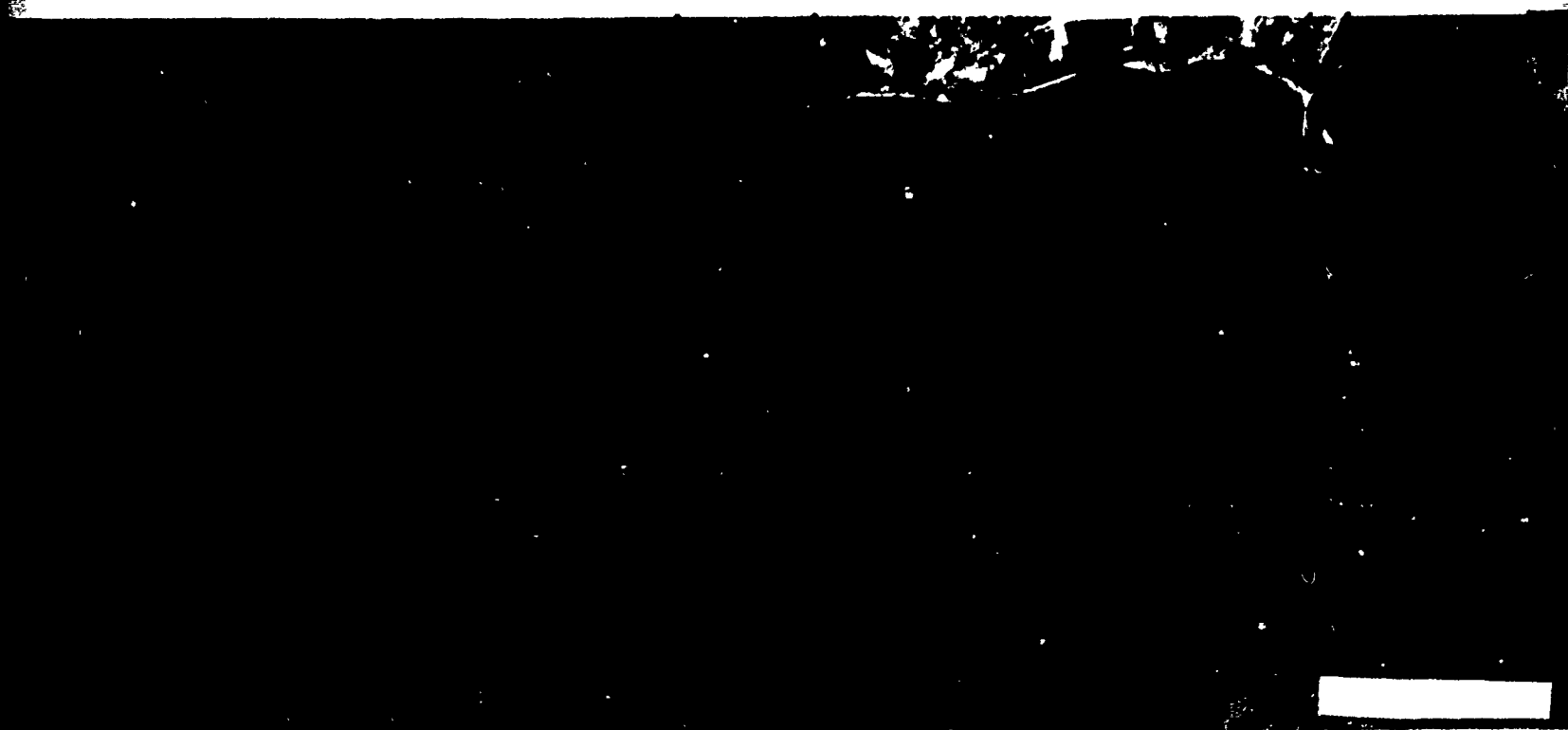
HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 40
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN





HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 41
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN





HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 42
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN

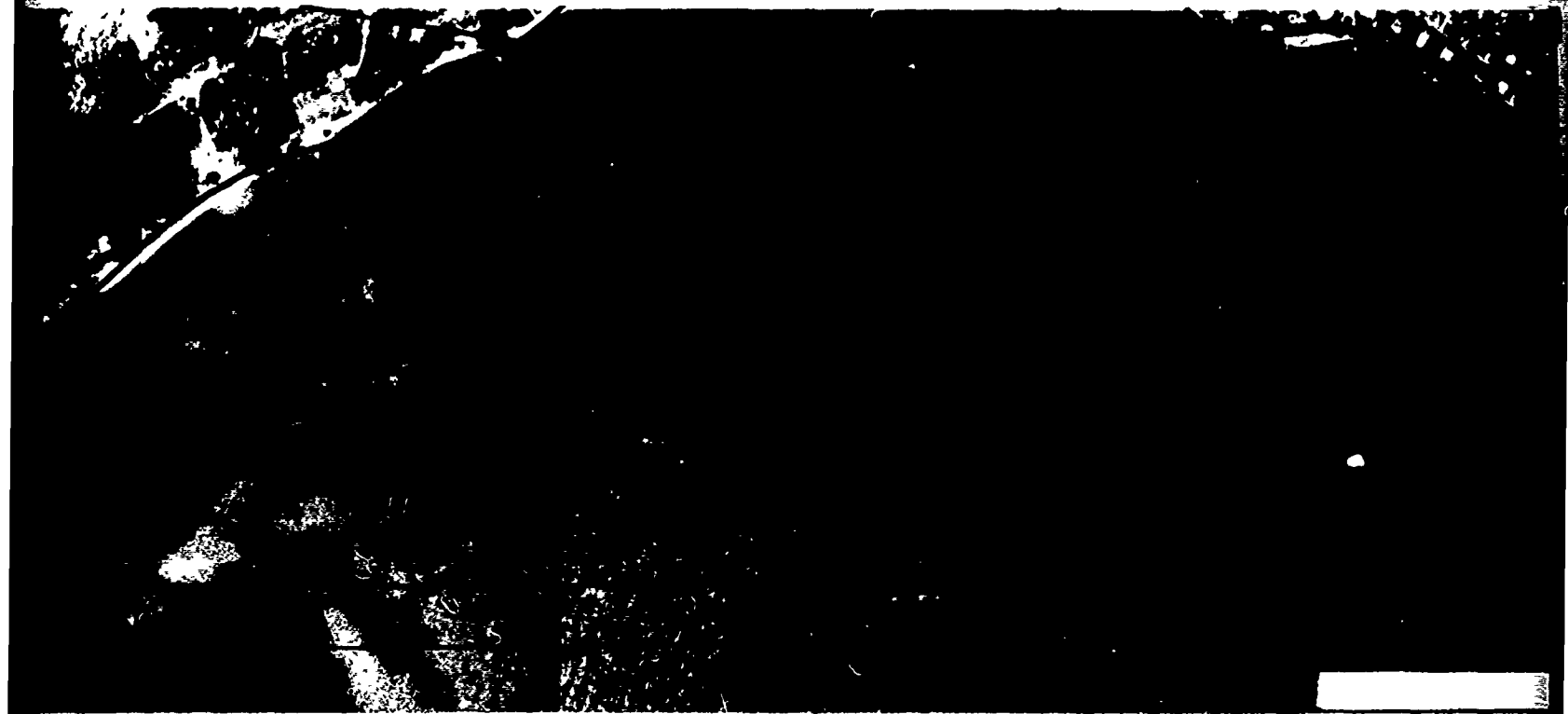




HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 43
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN



2

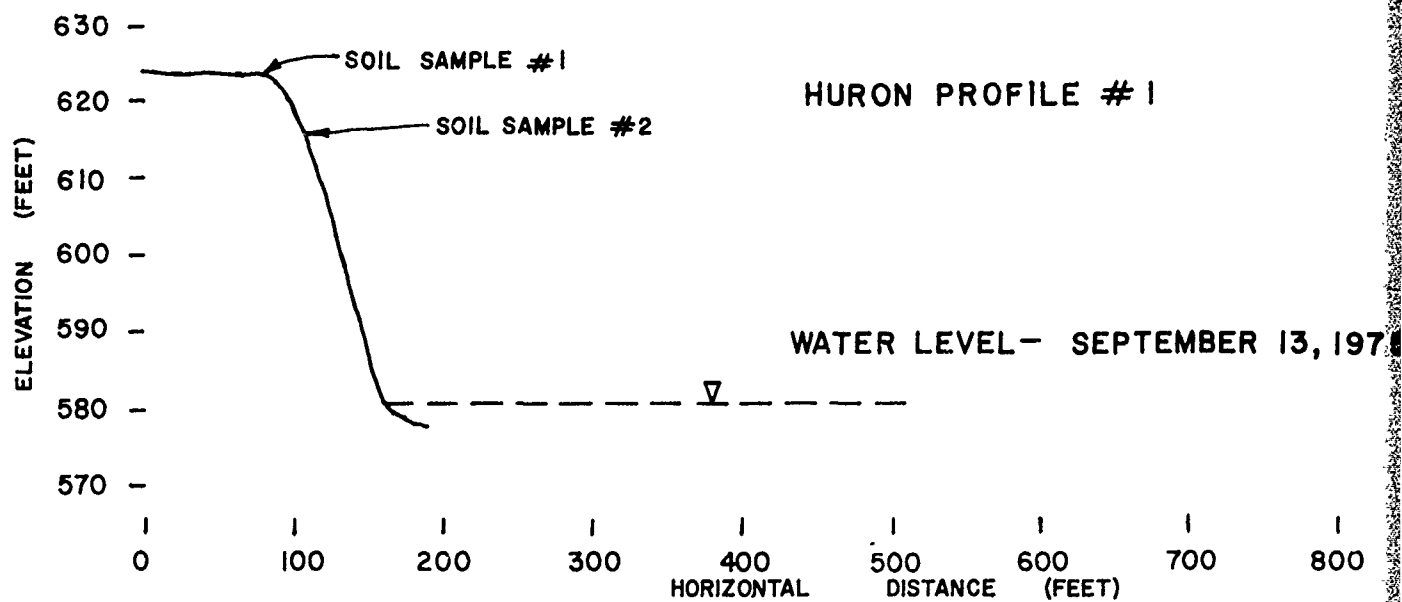
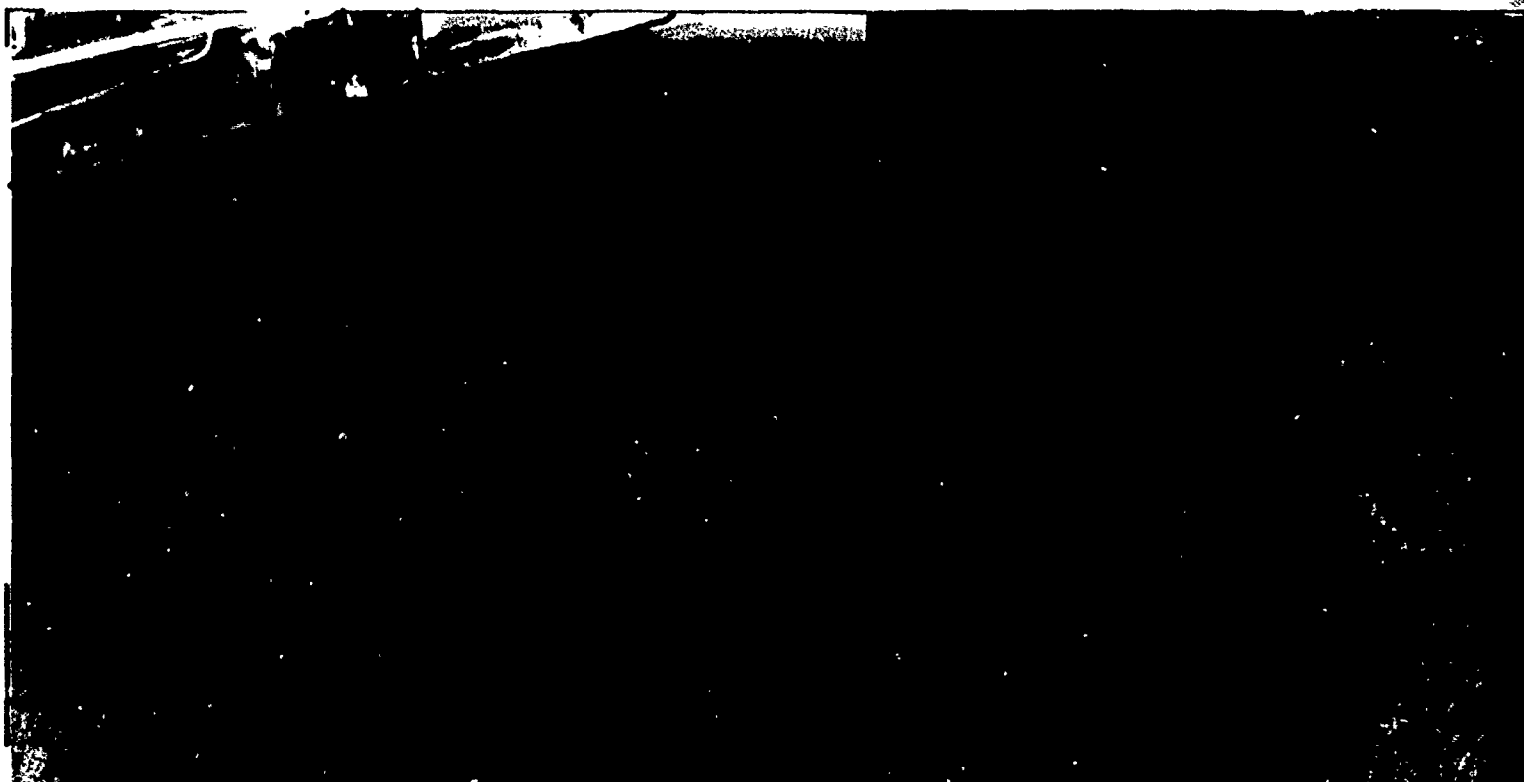


HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 44
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN





HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 45
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN



1

2



BER 13, 1975

HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 46
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN

800

900

1000

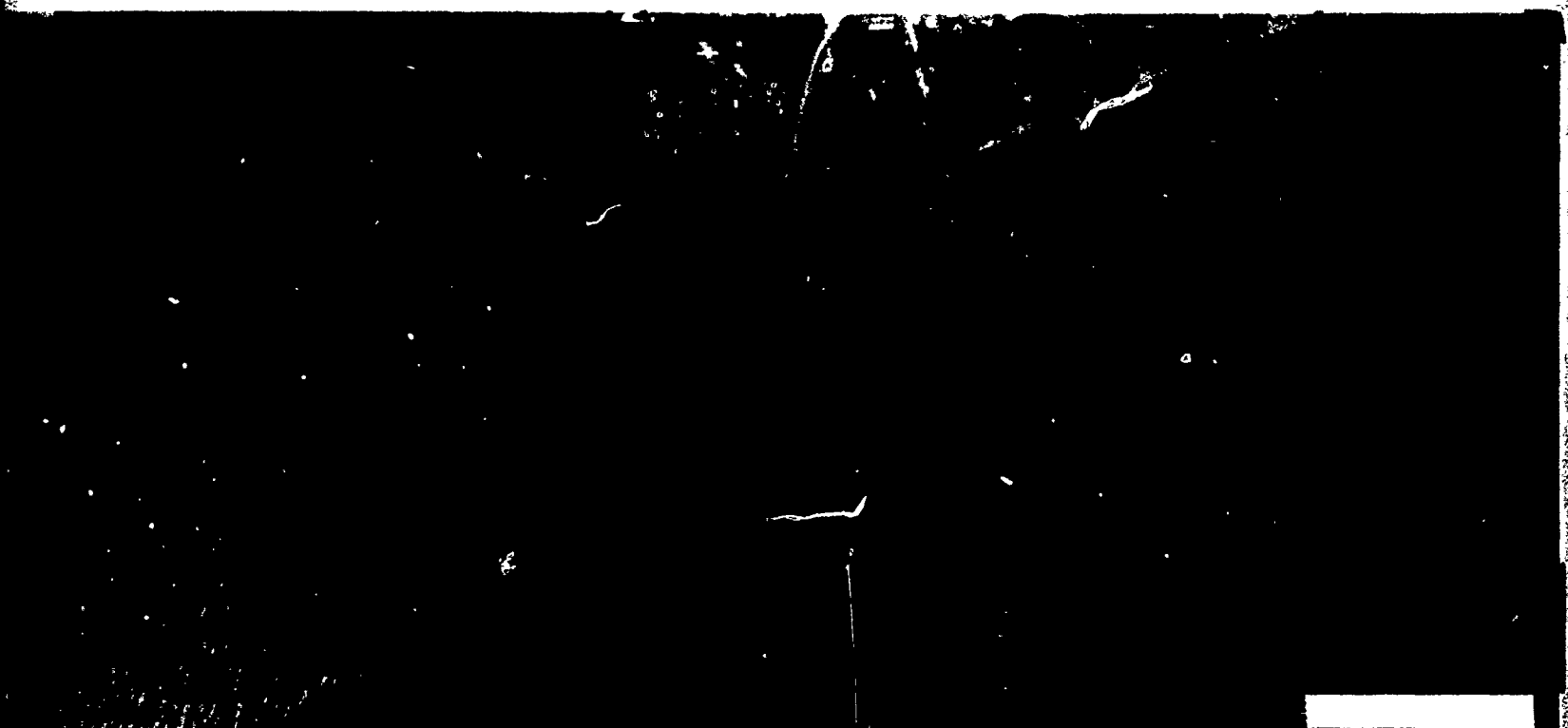
HURON COUNTY, MICHIGAN REACH #5

Variable	No. of Responses	Mean	Standard Error of Mean	Range		Adjusted Expanded Total for All Property Listings
				Minimum	Maximum	
Assessed Value (\$)	16	6000	3400	100	12000	
Reported Market Value (\$)	11	54000	69500	5000	250000	
Bluff Height (Ft.)	9	54	25	3	80	
Beach Depth (Ft.)	9	30	23	10	75	
Bluff Lost (Ft.)	7	27	34	1	99	
Beach Lost (Ft.)	10	83	149	10	500	
Damages Erosion (\$)	3	1350	1150	500	2650	
Damages Flooding (\$)	5	550	300	200	1000	
Damages - Erosion and Flooding (\$)						71,000
Protective Structure Cost (\$)	6	600	800	50	2200	38,000
Total Damages (\$)	7	1500	1550	400	4850	109,000

Number of Self-Administered Assessments Mailed: 25

Total Identified Residential Properties: 74

Self-Administered Assessment Respondents: 16



HURON COUNTY
PILOT DAMAGE STUDY, 1975
PLATE NO. 47
SCALE: 1" = 500'
COASTAL ZONE LABORATORY
THE UNIVERSITY OF MICHIGAN